RoboVent®

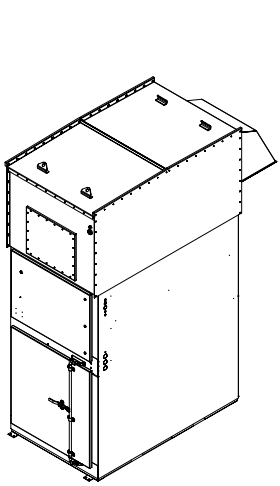
Fusion 4.5 Series

(DT4.5-) Cartridge Collectors

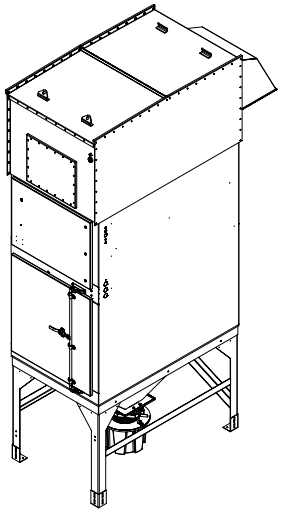
Owner's Manual

Installation, Operation & Maintenance

Revised 11-20-20



Fusion 4.5 with Dust Tray and Silencer Options



Fusion 4.5 with Hopper & Short Drum and Silencer Options

Fusion 4.5 Series

(DT4.5-) Cartridge Collectors

Owner's Manual

Installation, Operation & Maintenance

Manufactured by:
RoboVent
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(888) 762-6836
www.robovent.com

Models:

DT4.5-9000-6
DT4.5-12000-8
DT4.5-15000-10
DT4.5-22500-15

Modular Models:

DT4.5-30000-20
DT4.5-45000-30
DT4.5-67500-45
DT4.5-90000-60

Congratulations!

Dear Customer,

Thank you for purchasing a Fusion 4.5 Series Collector. This manual will help you install, start-up, commission, maintain, and troubleshoot your new dust collector. Please take time to read this manual thoroughly before installing and/or operating your unit.

When your Fusion 4.5 dust collector is due for scheduled maintenance, keep in mind that RoboVent has specially trained staff to perform these tasks. If you would like one of our qualified service staff to discuss a customized service plan for your factory, don't hesitate to reach out. Our team can also discuss the wide array of replacement filter cartridges we have in stock for purchase to maximize your dust collectors efficiency and performance. For any technical issues you may experience, RoboVent has a dedicated technical support team that is only a call away 24-7.

At RoboVent, we are committed to making your facility a safe and healthy environment for your workers. We look forward to continuing to work with you!

The RoboVent Team

Table of Contents

SECTION 100

Important Safety Instructions

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Important Safety Instructions

Failure to follow all instructions may result in electric shock, bodily injury and/or destruction of the unit.

Use of controls, adjustments, or performance of procedures other than those specified herein, may result in electrical shock.

IMPORTANT SAFETY INSTRUCTIONS

1. Read all instructions thoroughly.

2. Heed all warnings.

3. Do not block intake or exhaust vents. Keep the exhaust vent free from debris and materials that could restrict airflow. Prolonged restriction could damage the motor and electrical components. Any blockage of the air flow will decrease efficiency of this unit.

4. Refer all service matters to qualified service personnel. Servicing is required when the unit is damaged in any way including the control panel, supply wiring or in the case of excessive filter loading.

5. **Disconnect power before working on the motor or blower wheel. The motor or blower wheel should be disassembled only by a factory authorized technician.**

6. **Risk of serious personal injury or death!** Use extreme care to make sure you are never in a position where your body (or any item you are in contact with, such as a screwdriver or test instrument) can accidentally touch the blower wheel.

7. If welding stainless steel, special safety measures need to be followed when maintaining collector. Consult your Safety Director for further information on **OSHA's Hexavalent Chromium Standards.**

SECTION 200

Glossary of Terms

RoboVent®

SECTION 200

Glossary of Terms

Autogates/Blast Gates: Blast gates are gate valves used to focus a dust collection system's vacuum pressure for maximum dust (or other material) extraction at the desired location. Blast gates are positioned near individual pieces of machinery and operate by being, by default, closed — blocking air flow. They are opened as needed to achieve the desired air velocities at the specific inlet point.

Containment: This term is used to describe the portion of the dust collector that is collecting particulate for removal and/or disposal. This is typically either a hopper, or a tray.

Damper: A damper is a valve or plate that stops or regulates the flow of air inside a duct, chimney, VAV box, air handler, or other air-handling equipment. A damper may be used to cut off central air conditioning (heating or cooling) to an unused room, or to regulate it for room-by-room temperature and climate control.

Delta3: RoboVent's proprietary Spark Arrestor that utilizes cylindrical force and air patterns to extinguish sparks and prevent then from entering a dust collection system.

Differential Pressure: The difference in pressure between the dirty air side of the enclosed plenum and the clean air side of the enclosed plenum. This difference quantifies the amount of loading across the cartridge filters installed in the machine and allows you to monitor and understand when a filter change is necessary. Typically measured in either KPA (Kilopascal) or Inches of Water Column (Notated by SP or WC).

E-Drive: A variable frequency drive setup with pressure transmitters to control the speed of the motor on the dust collector. This device regulates the motor speed and increases its speed to compensate for losses occurring within the dust collector, primarily filter loading. This allows the dust collector to maintain a consistent airflow throughout the life of the cartridge filters while also saving energy by eliminating the need to run a collector at full speed with little to no filter resistance.

ePad: A RoboVent program that has been designed and trademarked for the operation of Fusion Dust Collection equipment. The program is accessible through the HMI, and works with the onboard PLC to provide insight into the performance of the dust collector, as well as the ability to control the unit.

Fire Suppression System: A system that is installed onto an industrial machine, e.g. a dust collector, to control a fire from spreading. These systems allow necessary personnel to get to the scene of the event and react appropriately, while using gas or chemical agents in the space the event occurred to limit its immediate damage.

Glossary of Terms

Hexavalent Chromium: Hexavalent chromium [Cr(VI)] is one of the valence states (+6) of the element chromium. It is usually produced by an industrial process. Cr(VI) is known to cause cancer. In addition, it targets the respiratory system, kidneys, liver, skin and eyes. Chromium metal is added to alloy steel to increase hardenability and corrosion resistance. A major source of worker exposure to Cr(VI) occurs during "hot work" such as welding on stainless steel and other alloy steels containing chromium metal. Cr(VI) compounds may be used as pigments in dyes, paints, inks, and plastics. It also may be used as an anticorrosive agent added to paints, primers, and other surface coatings. The Cr(VI) compound chromic acid is used to electroplate chromium onto metal parts to provide a decorative or protective coating.

HMI: A human-machine interface (HMI) is the user interface that connects an operator to the controller for an industrial system. In the dust collection industry, these interfaces are utilized to connect the operator with the PLC that is controlling the operation of the equipment.

Hopper: A container for a bulk material such as grain, rock, or trash, typically one that tapers downward and is able to discharge its contents at the bottom. In the dust collection industry, a hopper is used to contain and funnel collected particulate into a tray or barrel so it can be cleaned out and/or removed from the dust collector.

OSHA: The Occupational Safety and Health Administration, an agency of the US government under the Department of Labor with the responsibility of ensuring safety at work and a healthful work environment. OSHA's mission is to prevent work-related injuries, illnesses and deaths.

PLC: A programmable logic controller (PLC) is an industrial digital computer which has been ruggedized and adapted for the control of manufacturing processes, such as assembly lines, or robotic devices, or any activity that requires high reliability control and ease of programming and process fault diagnosis.

Plenum: an enclosed chamber where a treated substance collects for distribution, as heated or conditioned air through a ventilation system.

Glossary of Terms

Pulse Cleaning System: In RoboVent's Fusion Dust Collectors, dust and fume enters from the side or back of the unit and flows from outside to inside the cartridge filters. The cartridge filters are cleaned by short bursts of compressed air injected through a common manifold that supports individual solenoid valves. The compressed air is accelerated by a special nozzle mounted above the filter cartridge. Since the duration of the compressed-air burst is very short, it acts as a rapidly moving air bubble, traveling through the entire length of the cartridge and causing the surfaces to flex. This flexing of the cartridges breaks the dust cake, and the dislodged dust falls into a storage tray or hopper below. Reverse pulse-jet dust collectors can be operated continuously and cleaned without interruption of flow because the burst of compressed air is very small compared with the total volume of dusty air through the collector. The bursts of air are timed, and controlled by the pressure differential of the filters, as well as by pre-programmed threshold settings within the collectors onboard PLC.

Vortex: A specially designed RoboVent dust collector that is used in ambient filtration applications. This unit design sucks air in directly from the surrounding area, and discharges back into the area through a louvered plenum mounted to the top of the collector.

SafeSensor: A particulate monitoring device that is commonly referred to as a smoke detector. This device alerts your dust collector in the event of a thermal event or bypass. The device is triggered by smoke passing by the photoelectric sensing eye.

SECTION 300

Features of the Fusion 4.5 Series Collector

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Features of the Fusion 4.5 Series Collector

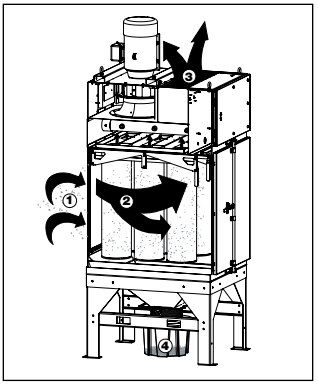

FIGURE 1

FIGURE 2

FIGURE 3

FIGURE 4

1. Filtration System

The RoboVent Fusion 4.5 Series cartridge collectors utilize a horizontal airflow into vertical cartridge filters as shown in Figure 1, maximizing airflow near the top of the cartridge plenum. This design helps overcome re-entrainment of the dust back onto the filter cartridge after it has been removed by the Pulse Filter Cleaning System. Air is brought in through the intake (1) and evenly distributed throughout the cartridge plenum (2). After passing through the Endurex Cartridge Filters, clean air is then returned to the plant through the exhaust vent (3). Formed dust cakes are pulsed off the high efficiency media and captured into the particulate containment below (4).

2. Vertical Filter Design

Vertically aligned filters allow the dust to shed off the filter and fall directly down into the containment system. The unique vertical design increases filter life by 30% to 40% over traditional horizontal filter placement.

3. High Performance Blower Design

Each RoboVent Fusion 4.5 Series Collector comes with a high output airfoil blower and direct drive motor. This highly efficient blower design and direct drive system maximizes the airflow (CFM) delivered by the motor power requirements. (see Figure 2).

4. Pulse Filter Cleaning System

RoboVent filter cleaning systems utilizes powerful compressed air pulses for unmatched filter cleaning. The on-line and off-line cleaning cycles are pre-programmed for optimal efficiency but can be customized for changes in usage patterns. (see Figure 3).

5. Pulse Cleaning Cones

The RoboVent Fusion 4.5 Series Collectors utilize a special cleaning cone which optimizes the cleaning pulse by ensuring that the developed overpressure in the filter is even throughout the filter element. (see Figure 4).

Features of the Fusion 4.5 Series Collector

FIGURE 5

FIGURE 6

FIGURE 7

6. Control Panel

The built-in Control Panel of the Fusion 4.5 Series contains all the electrical control devices, including the motor starter with thermal overload relay. Extra space is available for the optional E-Drive VFD and environmentally-friendly Fire Suppression System, Supprex-200. (see Figure 5).

7. ePad Control System:

ePad control system allows control of all aspects of the collector's functions including the blower, filter differential pressure and filter pulsing system. Preset from the factory with settings to cover most applications with optimal pulsing for efficient dust removal. ePad Control System allows for the user to adjust the pulsing schedule if needed due to changes in production or increased usage and Auto or Manual start of the blower. (see Figure 6)

8. Sturdy 11 GA Reinforced Collector Housing Construction

This heavy-duty construction secures a lifetime of industrial use. Seams are robotic welded and sealed to assure there are no leaks or cracks that could contaminate the facility air system.

9. Large Capacity Dust Tray/Optional Hopper

RoboVent Fusion 4.5 Series Collectors come standard with an oversized Dust Tray (see Figure 6), optional hoppers (see Figure 7) with short drum (20 gallon, or 55 gallon drums) are available for heavy dust production applications or extra capacity to reduce frequency of dust clean outs. Both the Dust Tray and the Hopper are designed to capture and store particulate pulsed off the filter cartridges and minimize "re-entrainment." (Re-entrainment is the term used for picking up dust that has already been removed from the filter and re-depositing it on the filter.)

Features of the Fusion 4.5 Series Collector

FIGURE 8

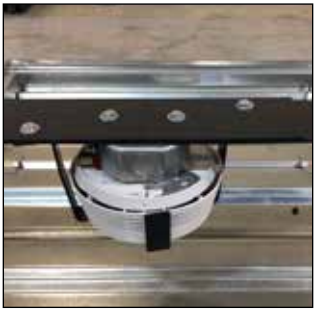

FIGURE 9

FIGURE 10

10. SnapLock Front Load System

Cartridge filters are easily accessible through an oversized front door. RoboVent's SnapLock Front Load System uses a specially designed lift mechanism and a front load track that locks the cartridge filter in place with a single action lever. RoboVent's SnapLock System allows filters to be loaded and unloaded in the fraction of time of traditional side loading systems. (See Figure 8)

11. Acoustic Motor Plenum

High-density sound materials and Bass Trap Acoustics have been implemented as part of the blower compartment. The acoustically designed plenum greatly reduces motor and blower noise levels and decreases ambient noise into the facility.

12. SafeSensor Particulate Monitoring Device

The SafeSensor particulate monitoring device detects a leak past your filters. If a leak occurs, the system shuts the equipment down and sets off an alarm. The SafeSensor also monitors smoke, and in case of a fire, will automatically shut down the motor and blower. It will also change the andon light to red and sound a high intensity audible alarm. (see Figure 9).

13. Endurex A15 Filters (Standard, alternate medias are available)

The Endurex A15 filter media is RoboVent's high quality cellulose/polyester blend that provides superior filtration efficiency and long life in welding applications. Every filter is fire retardant and uses Nanofiber technology to achieve a MERV 15 efficiency rating. Endurex A15 filters are highly-efficient for particulate down to 0.1 micron in size. (Figures 10).

Features of the Fusion 4.5 Series Collector

FIGURE 11

FIGURE 12

FIGURE 13

14. E-Drive Auto VFD (option)

The E-Drive system uses a sensor that constantly monitors the airflow. Using a VFD, it automatically adjusts the RPM of the motor to compensate for filter loading. This reduces energy peaks, resulting in 20%-30% energy savings, and extending filter life. The eDrive is key for a system that is quieter, can operate at maximum operating efficiency and saves you money. (see Figure 11).

15. AutoSaver Auto On/Off (option)

The AutoSaver feature (if equipped) allows your RoboVent Fusion 4.5 Series air filtration system to rest when not needed, saving energy dollars. This also allows the unit to enter off-line pulsing mode to reduce filter loading if filter pressure is above threshold limits. The AutoSaver turns the system on when cutting, welding, or process operations start and turns it off after the specified duration of being idle. (see Figure 12).

16. Supprex-200 Fire Suppression System (option)

The Supprex-200 Fire Suppression System is engineered to our exacting standards for safety and effectiveness. The Supprex-200 is a two part system that combines heat activated suppression system and our safe sensor with intake and exhaust dampers. (see Figure 13).

If heat is detected, FM-200 gas (Figure 14) is released to suppress the fire either directly at the heat source through specialized heat sensitive tubing, or indirectly into the cabinet through a special discharge nozzle(s). With the Supprex-200 System there is little or minimal clean up after a fire as it is a clean agent.

Features of the Fusion 4.5 Series Collector

FIGURE 14

The effectiveness of this suppression system is greatly enhanced with the safe sensor smoke detection that is standard on all RoboVent Fusion 4.5 collectors. Once smoke is detected, the unit goes into an emergency alarm state, immediately shutting off the blower and activating the motorized intake and/or exhaust dampers to a closed position. This prevents air from continuing to flow through the system and maximizes the hold time of the FM-200 gas in the event the heat rises enough in the cabinet to trigger its release. An optional ABC-Dry Chemical suppression system is also available.

SECTION 400

Receiving & Inspection

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Receiving & Inspection

Receiving

RoboVent equipment is typically shipped on skids or direct loaded. The number of skids will vary, depending the type, size and accessories ordered. The skids or direct loaded equipment are too heavy to lift by hand. The items will need to be unloaded by an industrial forklift, crane, or overhead crane.

Inspection

A visual inspection of your equipment should be performed before it is removed from the truck. Dents, scratches, and other damages should be noted on the shipping documents, and also photographed. The structural integrity of the housing can be adversely affected by large dents. RoboVent should be immediately notified of any structural damage to your equipment. It is the purchaser's responsibility to file shortage reports and damage claims with the carrier and with your RoboVent Representative. The carrier is responsible for any damage to the equipment while it is in transit unless specific arrangements are made otherwise.

Compare the number of items received against the carrier's bill of lading. Inspect all items for apparent damage. Immediately report any shortages or obvious damage to the carrier and to your local RoboVent Representative, call the factory at **1-(888)-762-6836**, or email: **customer.service@robovent.com**.

When all skids are completely unpacked and uncrated, check all items received against the packing lists. Further inspect the unit and components for hidden damage. Again, report any shortage or damage to the carrier and to your local RoboVent Representative.

The filter cartridges are typically shipped installed in your collector. Be sure to check them for alignment, as they may have shifted during transit. If they have shifted, it is possible that damage may have been done. Remove all filter cartridges and inspect thoroughly.

Note: Do not return any damaged components without first contacting your RoboVent Representative to obtain a Returned Goods Authorization (RGA).

Small Parts

Carefully inspect all packing material before it is discarded, to be sure that no small parts have been missed.

SECTION 500

Installation

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FIGURE 15: SnapLock

FIGURE 16: Hardware Kit

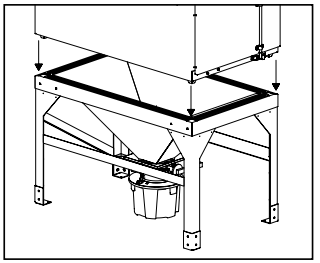


FIGURE 17: Lowering Cabinet

Tools Required:

- Impact Drill
- 9/16 & 3/4 socket
- 3/8" Nut Driver
- 1/2" Hammer Drill

Note: Remove the filters prior to assembly

SnapLock Front Load System: RoboVent's SnapLock Front Load System uses a specially designed lift mechanism and a front load track that locks the cartridge filter in place with a single action lever. RoboVent's SnapLock System allows filters to be loaded and unloaded in the fraction of time of conventional systems. (See Figure 15).

Assembly of your Fusion 4.5 unit will depend on the exact model and options ordered. For example, what type of particulate containment is required (e.g. Hopper Short Drum, or Hopper Long Legs). Forklift or Overhead crane will be needed, ensure they have adequate lifting capacity, and that all safety procedures are followed in their operation.

Assembly:

1. Locate the unit sub-assemblies adjacent to the required installation position. Ensure you have adequate room and access for all items.
   a. The hardware required for a standard installation is supplied in a kit. There may be more hardware items supplied than what is required for your exact unit. (Figure 16)
   b. If the Unit is supplied with Silencer, lift this off the top of the Motor Cabinet.

2. If unit is on Hopper Short Drum or Hopper Long Legs (Figure 17);
   a. Lift the Cabinets onto the Hopper, and align the sides so they are flush all around.
   b. Use a center punch or alignment punch to assist in centering bolt holes.
   c. Bolt through the underside of the Hopper lip, into the pre-installed weldnuts in the Filter Cabinets. Use sealing washers and locknuts on all bolts.

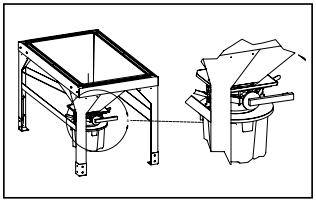


FIGURE 18: Shut Off Gate

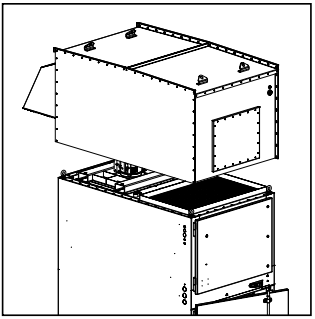


FIGURE 19:
Moving Lifting Eyes

FIGURE 20: MPS

3. If the unit is supplied with a Full Top Silencer for installation of the unit outdoors (Figure 19);
   a. Lower the Silencer using the top lifting lugs on to the top of the Motor Cabinet, ensuring the outlet screen is desired location for the clean air discharge, at the front or the rear of the Collector.
   b. Ensure the sealing gasket at the base of the silencer is not damaged as this will permit leaks. Replace any damaged sections where required.
   c. Connect the Silencer to the Motor Cabinet, using the supplied self-drilling screws, through the predrilled holes in the base flange of the Silencer.

Note: Don't damage the motor cabinet gasket during installation.

4. Compressed Air Hook-Up;
   a. **IMPORTANT!** Ensure the air supply line is hard piped and meets the 3/4" or 1" NPT minimum size required for the unit.
   b. Ensure the air compressor has the capacity to produce the rated SCFM stated for your model.
   c. The Fusion 4.5 come complete with an air regulator and accumulator. In most cases the provided accumulator will trap a low volume of oil and water in your compressed air supply lines.
   d. On the rear of the unit is a 3/4" or 1" NPT pipe for connecting the provided air regulator.

IMPORTANT! The provided regulator must be set to a maximum of 85 psi. Damage will result to the Pulse Filter Cleaning System if this is exceeded.

5. Electrical Hook-Up;
   a. The RoboVent Fusion 4.5 series collector requires a 3-phase electrical feed. The feed should be connected from your disconnect panel to the MPS (motor protection switch) shown in Figure 20 (refer to the specification sheet for your exact model for specific voltage and amperage requirements). An electrical service knock-out access hole is provided on each collector.

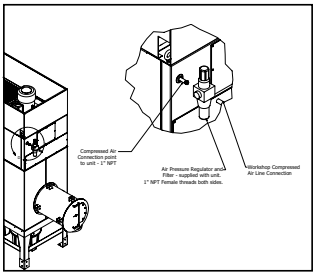


FIGURE 21: Air Regulator

Electrical connections should only be done by a licensed electrician and in accordance with NEC and all applicable local codes. (pull photo of MPS from last revision of DT4) per your revision on 9/13/19.

6. Air Regulator Adjustment;

IMPORTANT! Refer to the Specification Sheet for your exact model to determine the size of compressed air line, and capacity required for your collector. Ensure the air compressor has the capacity to produce the rated SCFM stated for your model. Your Fusion 4.5 Series unit needs a clean, dry, compressed air source. Many problems can be traced back to the presence of either oil or water in the compressed air stream. If contamination is present, both the filter cartridges and cleaning system will suffer.

The Fusion 4.5 unit comes complete with an air regulator and accumulator as shown in Figure 25. In most cases the provided accumulator will trap a low volume of oil and water in your compressed air supply lines.

On the top or the rear of the unit is a 3/4" or 1" NPT pipe for connecting the provided air regulator (refer to Figure 21). After running the Fusion 4.5 unit for 50 hours, unscrew the filter element from the accumulator housing and examine the element. If the element already shows excessive contamination, a larger accumulator will need to be installed. A dryer may also need to be placed in the line before the accumulator to avoid permanent damage to the solenoids, pulse valves and filter cartridges.

IMPORTANT! The provided regulator must be set to a maximum of 85 psi. Damage will result to the Pulse Filter Cleaning System if this is exceeded.

FIGURE 22: Supprex-200

FIGURE 23: Firetrace valve

7. Supprex-200 Fire Suppression System (option);
    a. Your RoboVent equipment comes standard with the patented "Smoke Detection Shut-Down system. This equipment will shut down the blower but will not extinguish a fire. The optional Supprex-200 Fire Suppression System uses a FM-200 agent to suppress a fire which is released at the closest point to the heat. Extra controls shut off the exhaust plenum to stop airflow. This system is wired into the control panel when purchased with the equipment (see Figure 22).
    c. Please note that if your unit is larger than 8-Cartridges, it will be shipped pre-assembled and no special Supprex-200 connections are required. However, you will need to locate the Firetrace tank(s), (Either in the Control Panel area, or in the Motor Access area) and turn the tanks on to ensure the system is ready to discharge when triggered. The tanks are off during transit to prevent any unintended discharge from occurring. (see Figure 23).
    d. Systems 8-Cartridges and larger also utilize an indirect discharge system through rubber hoses and nozzles specially installed before shipment. If you have any questions or concerns on the operation of these systems, please contact RoboVent Customer Service.

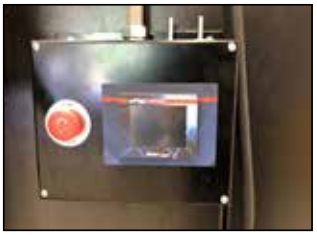


FIGURE 24: HMI Wiring

8. HMI Installation Instructions
    a. Mount the HMI panel (Figure 24) on the body of the dust collector at eye level. If the unit is on a Hopper or a Mezzanine, you can also mount the HMI to a support leg so it is at eye-level.
    b. Ethernet cable must be plugged into the interface module on both the control panel and the HMI enclosure.
    c. If your unit is installed outside, RoboVent recommends installing the HMI and an additional auxiliary horn strobe inside the building on the wall for ease of operation and maintenance, and also to protect the HMI from the elements.
    d. If you have a Modular unit configuration, please ensure all units are looped together appropriately with ethernet cabling between each PLC and the main control panel. Please consult your project manager or RoboVent Customer Service if you have any questions or concerns.

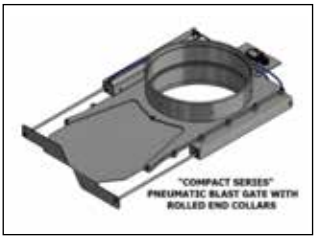


FIGURE 25

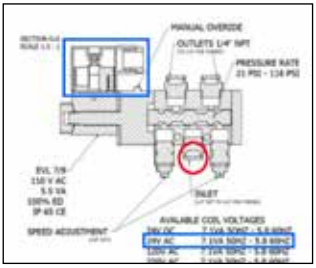


FIGURE 26

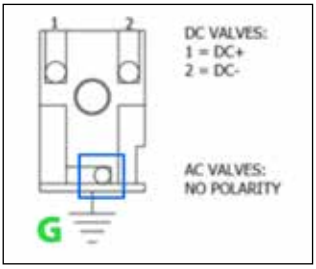


FIGURE 27

Intake Damper Installation (option)

Optional Accessory that comes with Supprex-200 System (If not pre-assembled onto unit at factory) (see Figure 25).

Refer to your engineering drawing to determine where to mount the intake damper on your system. Typically, the intake damper will be located directly on the intake or spark arrestor as close as possible to the unit.

Utilize these instructions to ensure your intake damper is connected appropriately both pneumatically and electrically. This damper is critical to have in place in order for the installed fire suppression agent to perform in the event you have thermal event.

- Mount the pneumatic blast gate in place.
- The blast gate should already have the tubing connected and Coil mounted to it .
- If there is a reed switch there is no need to install.
- You will need to connect both ¼ inch tubing (regulated from 80-90PSI) to the solenoid valve, and the wiring to the Din connecter.
- See Figure 26 for the ¼ inch tube connection. See Figure 26 & 27 for Din connecter wiring.

- Circled in red on Figure 26 is where the connection from the ¼ inch tubing will be connected this will need to be regulated from 80-90 PSI.
- Highlighted in blue in Figure 26 identifies where to locate the Din Connector and the Voltage requirement to power the valve. (24VAC 7.1VA 50HZ - 5.8 60HZ)
- Refer to Figure 27 for proper wire placements.

  1 = red wire (24VAC)

  2 = white wire (neutral)

  G = green wire (ground)

FIGURE 28

Intake Damper Installation (continued)

- See Chart 1.0 highlighted in yellow is the connections made to the Intake Damper Din connecter.
- See chart below, highlighted in orange will be the connection to be made from the Intake Damper Din connecter.
- See chart below, highlighted in gray this is a jump that needs to be made when adding in this blast gate (Intake Damper).
- Figure 28 will show how to make the Jump from 11 to 22.

Notes:

The wiring diagram (see Chart 1.0) is valid only when the coil voltage of ALL the dampers being wired to relay are 24VAC. When the coil voltages of dampers being wired to relay are mixed, (i.e. 24VAC & 24VDC) a different wiring diagram is required. Refer to Figure 29 and Chart 2.0 for example.

CHART 1.0: Wiring for 24VAC Coil Voltage Dampers

Terminal Strip wire # in RV control panel	PLC Output wire	Din Connecter terminal #	IDEC Relay Input Terminal #	Fuse holder
61			14	
41-			A1	
	62		A2	
		1 (24VAC)	24 (NO)	
2 (0VAC)		2 (0VAC)		
G (Ground)		G (Ground)		
			11 jumps to 21	60 (24VAC)

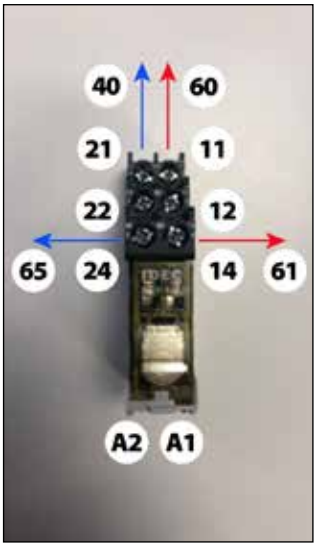


FIGURE 29

Intake Damper Installation (continued)

Notes:

When connections are made, and system is ready to be tested you can do so by turning system on and off. When system is on the dampers should open and when system is off the dampers should close. If you do not have the same wire colors from Figure 27 just make sure the connections match with Chart 1.0. If the dampers are acting in reverse you must bleed air supplying to the Valve and swap the Outlet tubes and retest.

- See Chart 2.0 highlighted in yellow is the connections made to the Intake Damper Din connecter
- See Chart2.0 highlighted in orange will be the connection to be made from the Intake Damper Din connecter.

CHART 2.0: Wiring for 24 VAC & 24VDC Coil Voltage Dampers

Terminal Strip wire # in RV control panel	PLC Output wire	Din Connecter terminal #	IDEC Relay Input Terminal #	Fuse holder
			11	60 (24VAC)
61			14 (NO)	
41-			A1	
	62		A2	
2 (0 VAC)				
40			21	
65		1 (24VDC)	24 (NO)	
41- (0 VDC)		2 (0VDC)		
G (Ground)		G (Ground)		

SECTION 600

Start-up/ Commissioning

RoboVent®

SECTION 600

Start-up/Commissioning

Once your Robovent collector has been assembled at your facility, contact your RoboVent Project Manager to get the start-up/commissioning and balancing of your system scheduled. Dependent on the scope of the contract, this may or may not be included in your projects scope of work as it is a small additional charge.

In order to schedule start-up/commissioning and balancing, the following items must be completed:

1. The RoboVent collector must be assembled
2. The electrical must be connected to the collector
3. The compressed air must be connected to the collector
    a. The compressed air line from the shop must go through the air regulator that RoboVent provides before it is connected to the collector.
    b. Clean, dry air is essential for operation.
4. The ductwork from the RoboVent collector to the cell/station(s) must be installed and connected.

Start-up/Commissioning and Balancing

Commissioning Your Unit

The following items checked during the start-up/commissioning process, as applicable to your specific layout:

1. Check the electrical connection to the collector and ensure there are no loose wires.
2. Check the compressed air that was hooked-up to the RoboVent supplied regulator and confirm it is clean, dry, and set to 85 psi.
3. Check the blower rotation on each motor to confirm it is spinning correctly.
4. Perform basic system check to ensure it is functional:
    a. Check to ensure blower turns on when touched on HMI
    b. Perform a valve check (See maintenance guideline for more information on how to perform this check) to ensure that each pulse valve is operational.
5. Check to ensure the fire suppression (FM200) tubing is hooked up correctly, if applicable.
6. Check the FM200 gauge to ensure your suppression tank is charged, if applicable.
7. Check that the filter differential tubes (running from the control panel to the reading ports) are correctly connected; ensure the filter pressure is reading correctly on the HMI control screen.
8. Check to ensure every bolt was installed during the collector assembly.
9. Check and confirm operation of other custom equipment options (ex: Explosion Vents, Intake Dampers, etc.).
10. Check the ductwork and ensure it is connected and sealed correctly.
11. Check the filter and control door gaskets to ensure consistent seal during operation.
12. Check and ensure collector seams were properly sealed during the assembly process.
13. Verify and record the velocity (FPM) through the Delta3 spark arrestor, if applicable.
    a. Specific velocity range is required through the Delta3 to prevent sparks from getting through.
14. Verify and record the velocity (FPM) and airflow (CFM) for the entire system

15. Set and record the hertz that the VFD is set at, if applicable.
    a. The VFD will be set by using an airflow meter to measure and confirm the velocity (FPM) and airflow (CFM) within the ductwork.
16. Check the measured velocity (FPM) and airflow (CFM) vs. the designed velocity (FPM) and airflow (CFM).
17. Photos will be taken of the RoboVent Collector, RoboVent HMI, RoboVent Control Panel, Delta3 spark arrestor if applicable, ductwork install, and the customer's cell.
18. Record any parts that need to be fixed or replaced, if it cannot be done at that time.

Congratulations! Your unit is now fully commissioned and ready for operation.

SECTION 700

System Balancing

RoboVent®

System Balancing

Before fully releasing your new RoboVent into production, RoboVent recommends a system balance. Balancing is recommended to ensure the designed velocity and airflow is being pulled from each drop on the system.

The following process is a high-level view of how to balance an industrial ventilation experts. Balancing should only be completed by trained ventilation experts. If you interested in having your system(s) balanced or rebalanced, contact RoboVent at 1-888-ROBOVENT.

1. Prior to starting the Balancing Procedure ensure that all autogates/manual blast gates are fully open for the entire system.
2. Following the balancing print (engineering drawing showing airflow requirements at each air pick-up point on your system), locate the drop with the highest pressure draws.
3. Balancing should start at the highest static point.
4. Record the elevation of the plant, the temperature within the ductwork, and the static pressure within the ductwork. If these values stray from the standard (Standard: Elevation > 1000 FASL; Temperature > 90 F; Static Pressure 20" w.g.) you must do a density factor correction.
5. Starting with the highest static point adjust the VFD until the required CFM is achieved (Blast Gate must be fully open).
6. Move to drop number 2 on the balancing print. Adjust the blast gate until the desired CFM is reached.
7. Repeat for the remaining drops in descending order.
8. Record all values (velocity and static pressure at each drop).
9. Once complete go back to the first drop and re-check the system. If the measurement is within 15% of the original value obtained at that location the balancing is complete. If the value strays more then 15% from the original value, then the system needs to be checked for changes, and/or re-balance the system.

SECTION 800

Operating your Fusion 4.5 Collector using the ePad Controller

RoboVent®

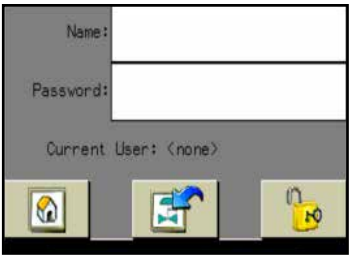
System Control Page

System Control

Enables/Disables the system for blower control. "Off" is under security. A login is required to turn unit off.

Login

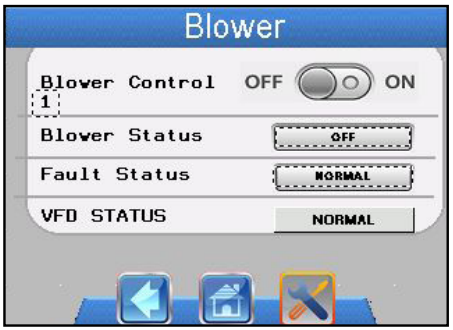
Allows customers to login with their provided User Name and Password to change parameters.

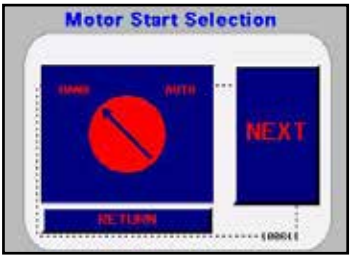


Auto Control

Enables RoboVent unit to be turned on or off from a connected machine.

Blower Control Page





Blower Control

Enables/Disables the blower to run the collector.

Blower Status

Message box which shows the current status of the blower.

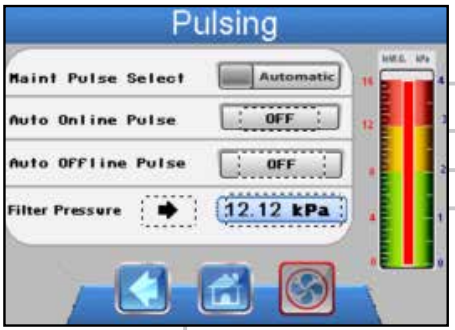
Fault Status

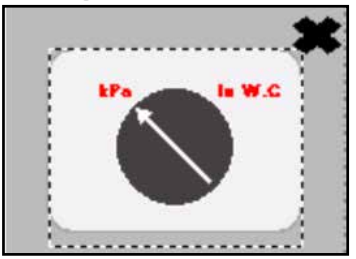
Message box which shows the current condition for the Motor overload.

VFD Status

Message box which shows the current condition of the Variable Frequency Drive (VFD). Also allows user to reset when there is a fault.

Pulsing Control Page





Maint. Pulse Select

Allows User to switch from automatic pulsing and maintenance pulse down mode.

Auto Online Pulse

Message box which shows the current status of the Auto Online Pulse Cycle (On/Off).

Auto Offline Pulse

Message box which shows the current status of the Auto Offline Pulse Cycle (On/Off).

Filter Pressure

Message box which shows the current status of Filter Pressure in the collector.

*Use the Arrow button to change readout from kPa in W.C.

Unit Hours Page

Total Machine Hours

Display showing the accumulated machine hours.

Hours Since Service

Display showing the accumulated machine hours since service has been conducted on the collector.

Service Hours Reset

Service Hours reset button. When pushed resets the Service Hours Meter to zero.

Service Messages Page

Filter Service Message

Informs the operator that the filters need maintenance.

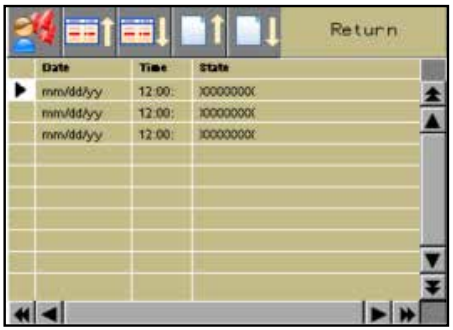
Suppression Tank Message

Informs the operator that the Suppression Tank needs to be serviced.

Collection Drum Message

For optional barrel sensor, informs the operator that the collection drum is full and needs to be emptied.

Alarm Log Page



Acknowledge All Alarms

Acknowledge all current alarms that are active.

Alarm Scroll Navigation Buttons

Allows for scrolling up and down by alarm and page.

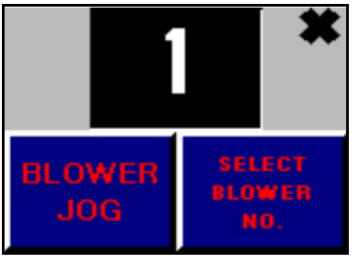
Alarm Notification Window

Date: Shows current month, day and year.

Time: Shows time when alarm was activated.

State: Shows the current state of the alarm (active, deactivate and acknowledged).

System Settings Page



Blower Jog

Momentary contact to test blower rotation, etc.

Pulse Test

Momentary contact that energizes pulse valve. Helpful for diagnostics.

Shut Down Delay

Amount of Time (in minutes) equipment continues to run after the remote start signal ends.

System Settings Page

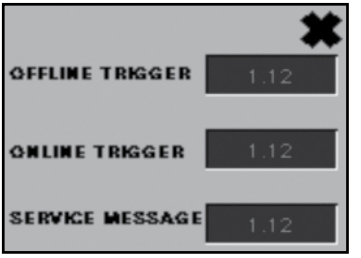
Bar Graph Control

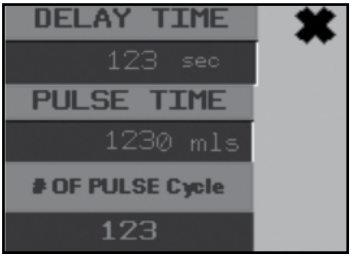
High Limit: Controls the position of the top pointer.

Low Limit: Controls the position of the lower pointer

Scale Maximum: Sets the overall range of the display. Usually set at 4.00.

System Settings Page





Pulse Control Settings

There are (3) different Pulse Modes. Online (while running), Offline (after shutdown) and maintenance (at select times to maximize filter life).

Online: Filters are pulsed while unit is running.

Offline: Filters are pulsing after the blower(s) are shut down

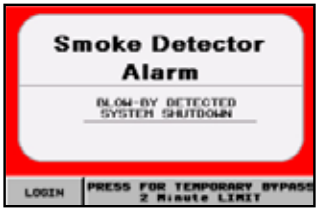
Maintenance: Filters are pulsed for an extended period, for maximum cleaning.

Delay Time: Amount of time (in seconds) between pulses.

Pulsing Time: Amount of time (in milliseconds) that pulse valve is open. Usually set at 200 msec. (Note: The right hand zero is fixed, so enter 200 for 200).

Post Cycles: Number of times each filter bank is pulsed after blower shutdown.

Warning and Alert Messages



Alarm Screen- Blow-By Detected

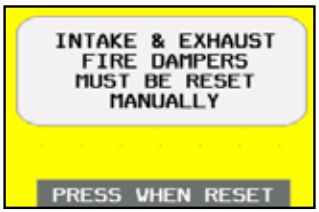
This feature is very important. It detects both when filters are 'leaking' as well as if there is smoke present.

Temporary Bypass: Provides for unit operation, Bypasses detector for two minutes.

Alarm Screen- Optional Equipment

Indicates the fire suppression tank is low or empty. Unit will operate without tank being full but it is not advised.

Proceed Without Servicing: When proceed without servicing button is pressed, screen is switched to screen #2.



Alarm Screen- Optional equipment

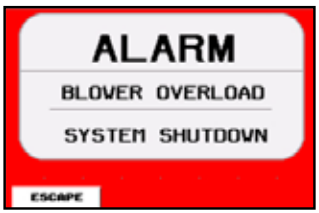
Indicates the fire dampers have been deployed.

Unit will NOT operate properly until dampers are reset.

Only press **RESET** button when dampers have been reset.

Alarm Screen- Emergency Stop Tripped

Indicates tripping of an E-stop. Unit controls are completely shutdown.



Alarm Screen- Blower Overload

Electrical power overload Escape; transfers to screen #2.

SECTION 900

Maintenance

RoboVent®

Safety

When performing maintenance on your RoboVent, PPE is required to minimize exposure to metal dust. At a minimum it is recommended to wear disposable coveralls with hood, non-porous gloves, P100 filtered respirator and safety goggles. Consult your company's policies to develop MSDS and PPE related documentation and procedures.

Dust collected by your machine may be hazardous. Toxicity testing must be performed by your local waste service provider and dust must be disposed of in accordance with local, state and federal law.

When ladder or lift is required to access the machine disconnect and spark arrestor(s) during service, use proper fall protection equipment and follow all OSHA safety regulations.

Special Safety Note

OSHA®

Stainless steel processes create a hexavalent chromium (hex chrome) dust which is a known carcinogen. Special care should be taken when servicing a in area that processes stainless steel. For more information regarding Hex Chrome, please visit OSHA's section on Occupational Safety and Health Standards-Toxic and Hazardous Substances-Chromium (VI).

FIGURE 30

FIGURE 31

FIGURE 32

FIGURE 33

Monthly Maintenance

On a monthly schedule, perform the following steps and checks to ensure proper machine function and performance.

Tools required for maintenance: (see Figure 30).

1. 8mm wrench
2. Lock Out set
3. Clean rag(s) and an industrial cleaner
4. Industrial cleaning brush (with extension is ideal)
5. Industrial vacuum with HEPA filter
6. Trash bags for disposal of particulate from cleaning process. Follow proper protocol for discarding contaminated waste.
7. Ladder or lift depending on unit location and placement

Maintenance Procedure:

1. Start the machine and record the starting filter differential pressure once the blower reaches full speed. (see Figure 31).
2. Turn blower off (not system off-leave system on). (see Figure 32).
3. Offline pulse will start. Leave machine for a half hour to allow pulsing to finish. This will send a jet of pressurized air through the filters to knock the dust built up on the filters and into the dust containment. Allowing enough time for this procedure is necessary to ensure filters are thoroughly cleaned thus improving filter life. (see Figure 33).

FIGURE 34

FIGURE 35

FIGURE 36

4. Check the function of each pulse valve from the diagnostics screen. Listen for the valve to fire or for air leaks. Failed pulse valves will fail open draining the air supply. If this happens, turn off the air supply and contact RoboVent tech support (1-888-762-6836) for assistance. (see Figure 34).

5. Ensure the system is off on the HMI (Figure 35). Then, turn power to the machine completely off at the disconnect for the unit. This is typically located near the HMI. You can trace the incoming power wires back to the disconnect if in doubt. Follow Lock out Tag out procedures to ensure unit is de-energized before opening it up. (see Figrue 36).

6. Spark Arrestance: You unit will have either a Delta 3 or a Baffle Spark Arrestor installed.

    a. Cleaning your Delta3 (If applicable):

        i. Inspect the inside of your Delta3 for dust build-up using the built-in inspection port; you will need an 8mm wrench to perform this task. (see Figure 37).

        ii. If there is buildup on your Delta3, you will need to clean it to ensure safe operation and maximum performance of the spark extinguishing technology.

            1. The Delta3 is accessed through the top panel by loosening the ring clamp and removing the center bolt, then lifting by the two handles. (see Figure 38).

FIGURE 37

FIGURE 38

FIGURE 39

FIGURE 40

FIGURE 41

FIGURE 42

2. Use a long-handled brush to sweep/scrap dust loose inside of the arrestor. Once dust is dislodged, depending on the composition of the material, either wipe it out using a rag and industrial cleaner, or vacuum it out with your industrial vacuum. (see Figure 39).

3. Ensure inside walls of spark arrestor are clean and free of any build up to ensure continued function before putting your Delta3 back together.

b. Cleaning your Baffle Spark Arrestor (If applicable):

i. If your machine is equipped with Metal Mesh and Fire Baffle spark arrestance, it is recommended to have a complete second set in stock for a cleaning rotation.

ii. Using an 8mm wrench, unlock the spark arrestor door and open it up. (see Figure 40).

iii. Your spark arrestor will have 2 or 3 layers of metal filters. You will need to remove all the dirty metal mesh and fire baffles for cleaning. Set the dirty set aside for cleaning. If you do not have a rotational set of clean baffles and mesh, refer to the section on cleaning your spark arrestance filters. (see Figure 41).

1. Use an industrial parts washer sized for the mesh and baffle type.

2. Contact a local parts cleaning company that can handle both hazardous and nonhazardous waste.

3. Contact RoboVent for more information.

4. Once parts are cleaned, they should be inspected for damage and cleanliness.

5. Reinstall after they are completely dry.

iv. Vacuum out the track and area the mesh and baffles slide into using a shop vac equipped with a HEPA filter. (see Figure 42).

FIGURE 43

FIGURE 44

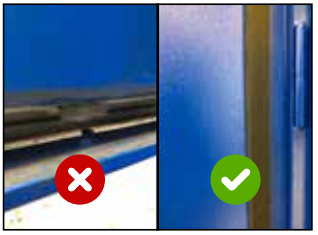


FIGURE 45

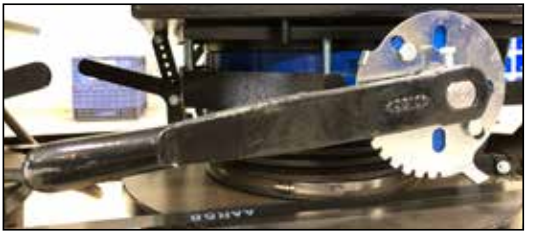


FIGURE 46

v. Insert the cleaned set of mesh and baffles in the same order and orientation. The baffles should be inserted with the cupped side facing out to ensure they are operating correctly to prevent sparks from entering your unit. (see Figure 43).

7. Inspect inside filter cabinet for build-up. Brush the interior walls pushing the dust down into the containment area. DO NOT BRUSH THE FILTERS. Brushing the filters will cause unseen damage severely shortening the filter life and efficiency. (see Figure 44).
8. Visually inspect filter door gasket. Any damaged, torn, or loose gasket will need to be replaced. (see Figure 45).
9. Close filter door.
10. Close and open hopper gate to check function. (If applicable; this is the optional SuperSeal hopper gate upgrade). (see Figure 46).
11. Record percentage full of the drum.
12. Visually inspect machine to ensure there are no signs of leakage, and that the latches and hinges are tight.
13. Confirm air pressure on filter regulator located at rear of unit is set to 85 psi. Suppled air should be clean and dry. Oil and/or water in the supplied air will damage the filters. Check the regulator bowl for any build up. Blow out any build up found by depressing the button on the bottom. (see Figure 47).
14. Ensure all doors and access panels are closed and drum is secure under hopper.

FIGURE 47

FIGURE 48

FIGURE 49

15. Check floor for any dust that may have spilled, clean as needed.
16. Remove lock-out and turn power to machine back on at the disconnect. Start blower, listen for any abnormal vibration or excess noise.
17. Record differential pressure of filters once the machine is at full speed.
18. Locate the smoke detector, it will be mounted above the clean air exhaust.
    a. Inspect the smoke detector and mount for any obvious signs of damage or dust build up.
    b. Press the test button on the smoke detector (while the unit is running). (see Figure 48).
    c. The smoke detector should shut the unit down and go into alarm. If the unit is equipped with dampers, the dampers will close. Ensure the dampers close all the way. (see Figure 49).
    d. Once you have confirmed the above operations, go to the control screen and press the reset. (see Figure 50).
    e. The unit should now be out of alarm state. Turn the system back on to ensure the unit restarts. Inspect the damper to ensure it fully opens on start up. (see Figure 51).
19. Now that all checks have been completed, return to normal 'ready' condition by turning blower off and making sure system is still on (indicated by a blinking green light).

FIGURE 50

FIGURE 51

FIGURE 52

Changing the Drum

Change the drum as soon as it is full. The time between drum changes will vary with production schedules or material being cut. A good estimate of time required between drum changes can be determined after a few changes; record percentage full and hours each time to help you estimate when the next change is needed.

To minimize hazards from dust or hazardous chemicals in the drum, you may use a drum liner. RoboVent does not offer these but they are readily available online. Insert photo of what a drum liner looks like.

Follow these steps to change the drum. Insert photo of hopper and drum.

1. Close hopper gate (if equipped). Rotate handle until it is parallel with the floor.
2. Lift drum lid mechanism. Push handles on each side of hopper downward until latched by catch on the lid.
3. Slide the drum out. (see Figure 52).
4. Estimate and record the percentage of dust in the bin.
5. If using a new drum: Remove lid from new drum and install on drum just removed. Dispose of full drum properly.
    a. If using a drum liner: Tie liner shut, remove from drum onto transport device. Insert new liner before placing underneath hopper again.
6. Set empty drum centered below hopper lid mechanism.
7. Lower lid onto drum and seal. Press latch handle down while rotating the catch to disengage it from the handle. Pull handles up until latched against stopper in upright position. Ensure barrel is centered inside the lid.
8. Reopen hopper gate (if equipped). Rotate handle so that it is perpendicular to the floor.
9. Check floor for any dust that may have spilled, clean as needed.

FIGURE 53

FIGURE 54

FIGURE 55

Filter Change

Filter condition is the key to maintaining clean air and an efficient dust collector. Filters get loaded with particulate and either need to be pulsed cleaned or replaced Filters should be replaced when the running filter pressure reads above 3 kPa after a full offline pulse cleaning.

1. Turn blower and system off. (see Figure 53).
2. Turn power to the machine off using disconnect on the control panel door. Lock out. (see Figure 54).
3. Lay out protective floor covering below door area for simplified clean-up.
4. Open filter door. Brush any built up debris from the door area into the hopper. (see Figure 55).
5. Unlatch filters by pulling the two handles on either side of each row toward you. (see Figure 56).
6. Remove filters individually, properly containing each filter as they are removed. Dispose of according to local regulations and according to processes determined as a result of dust toxicity testing.
7. Use a long-handled brush to sweep inside wall of cabinet and debris down into drum. (see Figure 57).
8. Take care not to get dust into the clean air side.
9. Change the drum as detailed earlier in this maintenance section.

FIGURE 56

FIGURE 57

FIGURE 58

FIGURE 59

FIGURE 60

FIGURE 61

10. Slide new filters into track and clamp down. Make sure filters are fully toward the rear by pushing on the top pans; the first filter should be behind the tabs in front of each row, marked with a label. Push levers forward to clamp and seal. Note – Improperly seated filters will cause dust to bypass into the clean air stream. (see Figure 58).
11. Visually inspect filter door gasket. Replace any loose or damaged gasket.
12. Close filter door.
13. Turn power to machine back on.
14. Turn system on and start blower.
15. Record new filter differential pressure. The blower will need some time to ramp up to speed. Once CFM and pressure have stabilized, the value can be recorded.
16. Reset the service hours on the control screen. (see Figure 59). You will need to login to reset.

    To login:

    User Name: SERVICE
    Password: 4703430

    a. Press the System icon, then on the System page, press the arrow to the right of Login. (see Figure 60).

    b. Press Name: enter user name, all caps, to ensure all caps you should see a green bar over the Cap button on left, third button down.

    c. After entering the User Name: **SERVICE**, press enter. (see Figure 61).

FIGURE 62

FIGURE 63

d. Press Password, press the 123 button, third button down on right side. Enter password: **4703430**, press enter. (see Figure 62).

e. This will return you to the Name/Password page. Press the unlocked padlock with the key in it(on right side) to unlock the system. If entered correctly, in the center of the page, Current User will change from <none> to SERVICE depending on what you entered.

f. System will notify if data was incorrect.

g. Once logged in, press home button. Then Machine hours, then reset to reset service hours

   Questions Please call us at 586-698-1800 ask for tech support when in front of the touch screen and I will be happy to review your settings and help change them.

17. Return to normal 'ready' condition by turning blower off and making sure system is still on (indicated by a blinking green light). (see Figure 63).

FIGURE 64

Motor Greasing

Motor bearing greasing frequency, type of lubrication and amounts will vary depending on the type and size of the motor in the unit. For more information, please contact RoboVent Tech Support at (**1-888-762-6836**) or email **customer.service@robovent.com**. Motor manuals can be sent upon request. As a general rule, RoboVent recommends greasing all motors over 20hp once annually. (see Figure 64).

FIGURE 65

FIGURE 66

Fire Suppression Inspections

Dry Chemical: Monthly Inspection

Inspection by the owner or end user should verify the following:

1. The Suppression Unit is in its proper location as installed by the factory or factory certified technicians.
2. The Manual Actuators are unobstructed.
3. The Suppression Unit shows no physical damage or condition that might prevent operation.
    a. This includes inspecting the detection tubing in the hazard area for abrasion, distortion, cuts, or dirt accumulation.
4. The Pressure Gauge is in the operable range. (see Figure 65).
5. The Nozzle Blowoff Caps are intact and undamaged. (see Figure 66).
6. Neither the Protected Equipment nor the Hazard has been replaced, modified, or relocated.

FIGURE 67

Dry Chemical: Semiannual Inspection

Semiannual Inspection is to be performed only by a Certified Firetrace Distributor.

1. Check to see that the hazard has not changed.
2. Inspect detection/actuation tubing, Manual releases, discharge piping, nozzles, signals, and all other auxiliary equipment.
3. Verify that the agent distribution piping is not obstructed.

Dry Chemical Powder

Examination of the Dry Chemical shall be conducted at an Authorized Firetrace Service Location at least once every 6 years. The powder will be examined for caking and may require replacement.

FM-200

Monthly Inspection

1. Ensure the Suppression Unit is in its proper location as installed by the factory or factory certified technicians.
2. Ensure the tank shows no physical damage or condition that might prevent operation.
    a. This includes inspecting the detection tubing in the hazard area for abrasion, distortion, cuts, or dirt accumulation. (see Figure 67).
3. The pressure gauge is in the operable range. (see Figure 65).
4. The Nozzle Blowoff Caps are intact and undamaged. (see Figure 66).
5. Neither the Protected Equipment nor the Hazard has been replaced, modified, or relocated.

Annual Inspection

Annual Inspection is to be performed only by a Certified Firetrace Distributor.

1. Remove the cylinder from the installation as follows:
    a. Close the ball valve by turning the ball valve lever clockwise to the "OFF" position
    b. Disconnect the detection tubing at the ball valve
2. Note: There will be a loss of nitrogen pressure out of the tubing
    a. Disconnect the copper tubing and fittings from the cylinder valve discharge ports(s)
    b. Immediately install the safety plugs(s) into the valve discharge port(s)
    c. Remove the cylinder from the bracket
2. Weigh the cylinder. Compare the measured weight with the weight found on the cylinder nameplate. If the container shows a loss in agent quantity of more than 5 percent or a loss in pressure (adjusted for temperature) of more than 10 percent, the cylinder shall be refilled or replaced.
3. Remove the nozzle(s) and inspect for obstructions. Reinstall the nozzles.
4. Reinstall the cylinder and re-pressurize the detection tubing with nitrogen following the applicable procedures outlined in Section 5.

VFD Maintenance Procedure

Periodic Inspection of VFD

Check the following items during periodic maintenance:

- The motor should not be vibrating or making unusual noises.
- There should be no abnormal heat generation from the Drive or motor.
- The ambient temperature should be within the Drive specification (-10°C to 40°C (14°F to 104°F)).
- The output current value shown in parameter U1-03 should not be higher than the motor rated current for an extended period of time.
- The cooling fan in the Drive should be operating normally.

Always turn OFF the input power before beginning inspection. Confirm that the digital operator indicators on the front cover have all turned OFF, and then wait an additional five minutes before beginning the inspection. Be sure not to touch terminals immediately after the power has been turned off. Doing so can result in electric shock.

WARNING: Prior to removing any protective cover or wiring any part of the Drive, remove all power sources, including main input power and control circuit power. Wait a minimum of 5 minutes after power removal, before removing any cover. The charge lamp located within the Drive should be off prior to working inside. Even if the charge lamp is off, one must measure the AC input, output, and DC Bus potential to insure safe levels prior to resuming work. Failure to adhere to this warning may result in personal injury or death.

Table 8.1 Periodic Inspection With NO Power Applied

ITEM	INSPECTION	CORRECTIVE ACTION
External terminals, mounting bolts, connectors, etc.	Are all screws and bolts tight?	Tighten loose screws and bolts firmly.
	Are connectors tight?	Reconnect the loose connectors.
Cooling fins	Are the fins dirty or dusty?	Clean off any dirt and dust with an air gun using clean and dry air at a pressure between 55-85 psi.
Control PCB Terminal PCB Power PCB Gate Drive PCBs	Is there any conductive dirt or oil mist on the PCBs?	Clean off any dirt and dust with an air gun using clean and dry air at a pressure between 55-85 psi. Replace the boards if they cannot be made clean.
Input Diodes IPMs Output Transistors	Is there any conductive dirt or oil mist on the modules or components?	Clean off any dirt and dust with an air gun using clean and dry air at a pressure between 55-85 psi.
DC bus capacitors	Are there any irregularities, such as discoloration or odor?	Replace the capacitors or Drive.

Apply power to the Drive and conduct the following inspection.

Table 8.2 Periodic Inspection With Power Applied

ITEM	INSPECTION	CORRECTIVE ACTION
Cooling fan(s)	Is there any abnormal noise or vibration, or has the total operating time exceeded 20,000 hours. Check UI-40 for elapsed cooling fan operation time.	Replace Cooling Fan

Preventative Maintenance of VFD

Table 8.3 Preventative Maintenance

INSPECTION POINT	ITEM	CHECK POINTS	EVERY 3-6 MONTHS	YEARLY
General	Environment	Ambient Temperature Humidity Dust Harmful Gas Oil Mist	**X** **X** **X** **X** **X**	
	Equipment	Abnormal vibration or noise	**X**	
	AC Power Supply	Main circuit & control voltage	**X**	
AC Power Circuit & Devices	Conductors & Wire Connections	Loose lugs, screws & wires Hot spots on parts Corrosion Bent conductors Breakage, cracking or discoloration Check spacing		X X X X X X
	Transformers & Reactors	Discoloration or Noise	**X**	
	Terminal Blocks	Loose, damaged		X
	DC Bus Capacitors	Leakage Ruptures, broken, expansion Capacitance & insulation resistance		X X X
	Relays & Contactors	Noisy Contact discoloration		X X
	Soft Charge Resistors	Cracked Discoloration		X X
Control Circuits	Operation	Speed reference voltage/current I/O contact operation		X X
Cooling System	Cooling Fans/Fins & Heatsink	Abnormal fan noise Loose connections Free of accumulation	**X** **X**	X
Keypad/Display	Digital Operator	LEDs Monitor display values Key functionality Clean	**X** **X**	 X X

If the Drive is used under the following conditions, it may be necessary to inspect more often:

- High Ambient temperatures, humidity or altitudes above 3,300 feet
- Frequent starting and stopping
- Fluctuations of the AC power supply or load
- Excessive vibration and/or shock loading
- Poor environment, including dust, metal particles, salt, sulfuric acid, chlorine

SECTION 1000

Motor Greasing Guide

RoboVent®

Motor Greasing Guide

Your RoboVent unit will have one of four motor manufacturers installed: **TECO, Marathon, Weg,** or **Baldor**.

These motors are created with anti-friction, grease-lubricated bearings. Grease is essential to your motor bearings because it creates an oil film that counteracts the abrasive metal-to-metal contact that can occur between rotating elements. Follow RoboVent's Motor Greasing Guidelines to properly lubricate your electric motor.

Manual Grease Gun

Heavy Duty Lever Grease Gun w/ 18"
Hose Ext & Coupler
Fastenal Part No. (SKU) 0425881

DELIVERY RATE = 1 OZ PER 28 PUMPS

Grease Conversion Chart for use with this grease gun

OUNCES (OZ)	GRAMS (G)	GREASE GUN PUMPS
0.1 oz	2.835 g	2.8 pumps
1 oz	28.35 g	28 pumps
2 oz	56.70 g	56 pumps
3 oz	85.05 g	84 pumps
4 oz	113.40 g	112 pumps
5 oz	141.75 g	140 pumps

NOTE: 1 Pump = 1 gram of grease

Teco Motor Greasing Guidelines

Lubrication Procedure

It is advisable to re-grease when the motor is running to allow the new grease to be evenly distributed inside the bearing. Before re-greasing, the inlet fitting should be thoroughly cleaned to prevent any accumulated dirt from being carried into the bearing with the new grease. The outlet of grease drainage should be opened to allow the proper venting of old grease. Use a grease gun to pump grease through grease nipple into the bearings. After re-greasing, operate the motor for 10-30 minutes to allow any excess grease to vent out.

Approved Greases

- All motors with ZZ bearings will have SHELL Alvania R3 (lithium base grease).
- All motors with open bearings will have Polyrex EM (polyurea base grease).
- Certain T-frame models will utilize special grease and will be noted on the lubrication nameplate.

Relubrication Time Interval & Amounts

*Fill new grease until it overflows and the old grease is entirely replaced.

Relubrication Time Interval

BEARING SIZE	MOTOR HP	GREASE AMOUNT IN GRAMS	1800 RPM – HOUR CHANGE INTERVAL	3600 RPM – HOUR CHANGE INTERVAL
All motors listed are ODP				
DE & NDE: 6306ZZ	5	30 grams	3000 hours	2000 hours
DE & NDE: 6306ZZ	7.5	30 grams	3000 hours	2000 hours
DE: 6308ZZ	10	30 grams	3000 hours	2000 hours
DE: 6310ZZ	20	40 grams	3000 hours	2000 hours
DE: 6311ZZ & DE: 6212C3	30	40 grams	3000 hours	2000 hours
DE & NDE: 6213 & DE: 6212C3	40	50 grams	3000 hours	2000 hours
DE & NDE: 6213 & DE & NDE: 6213C3	50	50 grams	3000 hours	1000 hours
DE: 6314, NDE: 6213, DE: 6313C3 & NDE: 6213C3	75	80 grams	3000 hours	1000 hours
DE & NDE: 6317, DE: 6313C3 & NDE: 6213C3	100	120 grams	2000 hours	1000 hours
DE & NDE: 6317 & DE & NDE: 6313C3	125	120 grams	2000 hours	1000 hours

Marathon Motor Greasing Guidelines

Lubrication Procedure

1. Stop motor. Disconnect and lock out of service.
2. Remove contaminates from grease inlet area.
3. Remove filler and drain plugs.
4. Check filler and drain holes for blockage and clean as necessary.
5. Add proper type of amount of grease. See the relubrication amounts table for volume of grease required.
6. Wipe off excess grease and replace filler and drain plugs.
7. Motor is ready for operation.

Approved Greases

- Chevron SRI #2
- Rykon Premium #2
- Exxon Polyrex EM
- Texaco Polystar RB

Service Types

- **Seasonal Service:** The motor remains idle for a period of 6 months or more.
- **Standard Service:** Up to 16 hours of operation per day, indoors, 100° F max ambient temp.
- **Severe Service:** Greater than 16 hours of operation per day. Continuous operation under high ambient temp (100 to 150° F), dirty moist locations, high vibration, heavy shock loading or where shaft extension end is hot.

Motor Greasing Guide

Relubrication Time Interval

	NEMA FRAME SIZE (IN RPMs)					
	140-180		210-360		400-510	
SERVICE CONDITIONS	**1800 RPM OR LESS**	**OVER 1800 RPM**	**1800 RPM OR LESS**	**OVER 1800 RPM**	**1800 RPM OR LESS**	**OVER 1800 RPM**
Standard	3 yrs	6 months	2 yrs	6 months	1 year	3 months
Severe	1 yr	3 months	1 yr	3 months	6 months	1 month
Seasonal	The motor remains idle for a period of 6 months or more					

Relubrication Amounts

NEMA FRAME SIZE	MOTOR HP	VOLUME OF GREASE
140	5 HP	4 grams
180	7.5 HP	8 grams
210	10 HP	12 grams
250	20 HP	16 grams
280	30 HP	19.5 grams
320	40 HP-50 HP	23.5 grams
360	60 HP-75 HP	27.5 grams
400	100 HP	34 grams
440	125 HP	42.5 grams

Weg Motor Greasing Guidelines

Lubrication Procedure

Machines without Grease Nipples

Motors up to frame size 215T are normally fitted without grease fittings. In these cases the regreasing shall be done during preventive maintenance service paying attention to the following aspects:

1. Take motor apart carefully.
2. Take all the grease out.
3. Wash the bearing with kerosene or diesel.
4. Dry the bearings
5. Regrease the bearing immediately.

Motors Fitted with Grease Fitting

It is strongly recommended to grease the machine while running. This allows the grease renewal in the bearing housing. When this is not possible due to rotating parts by the grease device (pulleys, bushing, etc.) that offer some risk to physical integrity of the operator, proceed as follows:

1. Clean the area near the grease nipple.
2. Put approximately half of the total grease and run the motor for 1 minute at full speed.
3. Then turn off the motor and pump in the rest of the grease.

Note: The injection of all the grease with the motor in standstill can make the grease penetrate into the motor, through the bearing housing inner seal.

Approved Grease

- Mobile Polyrex EM Grease

Special Note

The table below is specifically intended for relubrication with MOBIL Polyrex EM grease and bearing absolute operating temperature of:

- 70°C (158°F) for 254/6T to 324/6T frame size motors
- 85°C (185°F) for 364/5T to 586/7T frame size motors
- For every 15°C (59°F) above these limits, relubrication intervals must be reduced by half.
- Shielded bearing (ZZ) are lubricated for bearing life as long are they operate under conditions and temperature of 70°C (158°F).

*****When motors are used on the vertical position, their relubrication interval is reduced by half if compared to horizontal position motors.*****

On applications with high or low temperatures, speed variation etc., the type of grease and relubrication intervals is given on an additional nameplate attached to the motor.

Motor Greasing Guide

Relubrication Time Interval & Amount of Grease

FRAM SIZE	MOTOR HP	GREASE AMOUNT IN GRAMS	3600 RPM	1800 RPM
254 / 6T	20 HP	13 grams	15700 hours	20000 hours
284 / 6T	30 HP	18 grams	11500 hours	20000 hours
324 / 6T	40 HP	21 grams	9800 hours	20000 hours
364 / 5T	60 HP	27 grams	3600 hours	9700 hours
404 / 5T	100 HP	27 grams	3600 hours	9700 hours
444 / 5TS	125 HP	27 grams	3600 hours	9700 hours
RELUBRICATION INTERVALS IN HOURS				
324 / 5T	40 HP	21 grams	9800 hours	20000 hours
364 / 5T	60 HP	27 grams	4800 hours	9700 hours
404 / 5T	100 HP	34 grams	3000 hours	6000 hours
444 / 5T	125 HP	45 grams	2300 hours	4700 hours

Baldor Motor Greasing Guidelines

Lubrication Procedure

*****Lock off and tag out power at the disconnect before servicing*****
***** Motor should be warm prior to greasing*****

1. Locate the grease inlet, clean the area, replace the pipe plug with a grease fitting.
2. Remove grease drain plug.
3. Add recommended amount of grease. Stop when new grease appears at shaft hole in the endplate or grease outlet plug.
4. Replace grease inlet plug and run the motor for 15 minutes.
5. Replace the grease drain plug.

Correct Grease Gun Procedures

1. Use hand-operated grease gun, not a pneumatic grease gun. Pump grease slowly, taking 10 to 12 seconds to complete each stroke.
2. Apply quantity of grease called for. Over-lubrication can be as damaging as under-lubrication.
3. Do not over-lubricate motors. Over-lubrication of a motor can seriously damage it by forcing grease into motor windings. Over-lubrication of the extract motor can force grease into the centrifugal switch causing it to malfunction.

Approved Grease

- Shell Dolium R (factory installed)
- Chevron SRI (standard service conditions)
- Darmex 707 (high temp conditions)
- Arrowshell 7 (low temp conditions)

Motor Greasing Guide

Service Types

SEVERITY OF SERVICE	HOURS OF OPERATION PER DAY	MAX AMBIENT TEMP	ATMOSPHERIC CONTAMINATION	INTERVAL MULTIPLIER
Standard	8	104 F (40 C)	Clean, little corrosion	1
Severe	16 +	122 F (50 C)	Moderate dirt, corrosion	0.5
Extreme	16 +	>122F (>50 C) (NOTE 1)	Severe dirt, abrasive dust, corrosion	0.1
Low Temp		-22 F (-30 C) (NOTE 2)		1

Note 1: Use high temp grease

Note 2: Use low temp grease

Relubrication Time Interval

NEMA (IEC) FRAME SIZE	MOTOR HP	3600 RPM	1800 RPM	1200 RPM	900 RPM
Up to 125 (132)	5 HP	5500 hours	12000 hours	18000 hours	22000 hours
254 to 286 (160-180)	25 HP-30 HP	3600 hours	9500 hours	15000 hours	18000 hours
324 to 365 (200-225)	40 HP-50 HP	2200 hours	7400 hours	12000 hours	15000 hours
404 to 5000 (280-315)	100 HP-125 HP	2200 hours	3500 hours	7400 hours	10500 hours

Note: For vertically mounted motors and roller bearings, divide the relubrication interval by 2.

Relubrication Amounts

NEMA (IEC) FRAME SIZE	MOTOR HP	LARGEST BEARING IN SIZE CATEGORY	OD D MM	WIDTH B MM	VOLUME OF GREASE
Up to 215 (132)	5 HP-15 HP	6307	80	21	4.5 grams
254 to 286 (160 - 180)	25 HP-30 HP	6311	120	29	9 grams
324 to 365 (200 - 225)	40 HP	6313	140	33	12 grams
404 to 5000 (280 - 315)	100 HP-125 HP	NU322	240	50	31.5 grams

SECTION 1100

Troubleshooting

RoboVent®

RoboVent unit is making excessive noise. Check the following:

1. Make sure the blower wheel is not hitting the venturi.
2. Check that all venturi bolts are securely tightened.
3. Make sure motor bearings are good. (Amperage rating will be higher than normal.) Motor Overload will trip frequently/need to be set >then 125% FLA.
4. If the noise is an electrical hum in the control panel, it could be a defective motor starter relay. Loose connection in motor contact/loose wire
5. Blower wheel could be out of balance. If the blower wheel has gone out of balance, there will be excessive vibration. In this case, please contact the RoboVent Service Department at 1-888-762-6836. Blower wheels should only be balanced by qualified service personnel.

Pulse Filter Cleaning System not operating. Check the following:

1. Verify that the airline is connected to the air tank and that there are no pinched or clogged airlines.
2. Check air tank pressure at the filter regulator. The pulsing system works best when pressurized at 85 PSI.
3. Check settings of ePad Controller (Refer to Operation Section).
4. Manually test each valve to determine if you have a valve leak. If optimized pressure is supplied to the air tank and the timers are operational then a problem may exist with the solenoid diaphragm.
    a. Go to System
        i. Login as a Service User
        ii. Username: SERVICE
        iii. Password: 4703430
    b. Click on the settings
    c. Find and click on Pulse Test (Second page of settings)
    d. Click and test each individual valve. If during testing, one valve sticks or does not fire, you likely will need to replace the valve diaphragm. See **Appendix C** and order a new diaphragm kit from RoboVent Service Department.

Troubleshooting

Little or no suction at intake. Check the following:

1. Check motor rotation. When the unit is powered down note the rotation of the motor shaft. Motor rotation should be clockwise when viewed from above unit.
2. If motor is spinning backwards, Change Phase A and Phase C on Motor Starter. DO NOT change Phasing on disconnect or Overload.
3. Cartridge filters are loaded. Check the ePad Controller reading. Any reading of 2.50 kPa / 10" Water Column (Collector loading level maximums can vary depending on application, contact Robovent for specifics on your unit if in doubt) or greater signals that the cartridge filters could be loaded. Initiate a manual cleaning cycle (see "Operating your Fusion 4.5 Collector using the ePad Controller") before replacing cartridges.
4. Check Intake or Exhaust Dampers. If Dampers are closed, limited suction will occur.

Cartridge filters load up but no dust in the dust tray. Check the following:

1. Check that the Pulse Filter Cleaning System is working properly.
2. Check for oil or moisture on the filter media. If oil or moisture exists in the air supply, it will transfer to the cartridge.
3. In some cases, very high oil content is present on the surface of the steel stock, and the cutting process may cause the oil to vaporize. This will cause the cartridge filters to load up prematurely. In this situation the best solution is to remove most of the oil from the steel before it is processed. Call the RoboVent Service Department at 1-888-762-6836 for more information.

ePad HMI display reads "0" or has a consistently low reading for Filter Pressure.

1. Check that the plastic tubing from the Controller has not come loose from either of the barbed ends on the pressure transducer.
2. Check for a pinched line in the plastic tubing from the Controller.
3. Remove tubing from pressure transmitter connection barbs and blow air into the ¼" plastic tubing lines with low pressure away from the transmitter. Dust particles, insects and dirt can get into the tubing and prevent an accurate reading.
4. In some cases, the Pressure Transducer will need to be replaced.

Smoke Detector Alarm Sounds*:

1. Alarm trips – "SMOKE DETECTOR ALARM, Blow-By detected system shutdown".
    a. Power to motor is turned off by the onboard control system, and the audible alarm goes off alerting you of a shutdown. The Andon light on the cabinet door will turn red.
    b. If the unit is equipped with the Supprex-200 Fire Suppression system, intake and exhaust dampers will close, sealing off the unit. The exhaust dampers are fail-safe and will close either when the unit goes into alarm, or when power is cut off to the unit.
    c. Turn power off at the main disconnect for the unit.
    d. Turn the compressed air supply off to the unit.
    e. If your system is equipped with a Supprex-200 Fire Suppression System, do **not** open the filter door or proceed to the next step unless the necessary staff are present to extinguish a fire if one has occurred inside the cabinet. The Supprex-200 Suppression system utilizes intake and exhaust dampers to prevent oxygen from entering the cabinet after shutdown and uses a clean agent gas to suppress the fire for a limited amount of time to allow appropriate emergency response staff to arrive to the event scene. The suppression agent will not release unless the temperature in the cabinet has exceeded 383°F or a direct flame has touched the Firetrace activation tubing that is installed around the top of the filter cartridges.
    f. Check filter cabinet of unit for fire/smoldering filters.
    g. Have fire suppression equipment on hand in the event of a flare up.
    h. If smoldering, quickly remove filters from cabinet and use water to extinguish using appropriate protection equipment.
2. Clean and inspect unit for thermal damage, replacing filters if necessary, and power unit back up. ***It is important to note that not every smoke detector alarm is triggered by a thermal event. Dust bypass will also cause a smoke detector shutdown and could be occurring through a torn/damaged filter or damaged gasket on the filter top pan.***
3. Start unit (System On > Blower On). If no smoke alarm sounds, there may be a secondary alarm displaying on the HMI stating "intake and exhaust dampers must be reset manually" that must be cleared.
    a. To clear login in using the following credentials:
        i. Username: SERVICE
        ii. Password: 4703430
    b. On touch screen turn system off, then back on. If Intake alarm pops up again, press where is says "press when reset". This should clear the damper alarm.

4. If, when starting the unit back up, the smoke detector goes off again:
    a. Remove filters
    b. Inspect inside of filters for holes/perforations
    c. Check sealing gaskets for nicks or cuts.
    d. Re-install good filters / replace damaged filters, ensuring filters are level and square and the clamping mechanism is locked securely in place.
    e. Locate smoke detector, remove, and clean out with Low pSi compressed air, repeat start up process.
    f. You can also clean the smoke detector with water if it is exceptionally dirty.
        i. Unplug the connector from the back of your smoke alarm. Remove the battery.
        ii. Select (3) standard size wash buckets and fill them each with one gallon of normal tap water.
        iii. Add 1/8 cup of dishwashing liquid to the first bucket of water and allow it to mix thoroughly, then place on dirty smoke alarm into the soap water mixture until it becomes completely covered or submerged.
        iv. Allow smoke alarm to soak for approximately 10 minutes (longer if extremely dirty). Then agitate for 5-10 seconds to flush out any remaining dirt left inside smoke alarm's housing.
        v. Remove smoke alarm from wash water and transfer directly to one of the first rinse buckets containing clear water. Again, allow smoke alarm to become completely submerged, agitate once more for 5-10 seconds to remove soap residue.
        vi. Finally, transfer smoke alarm to your second and final rinse bucket, repeating method found in the previous step, then remove smoke alarm to a clean dry area to thoroughly dry before reinstalling. You can use Low pSi compressed air to expedite the drying process.
    g. Run blower for 2-4 minutes without cutting and/or welding process active to exhaust dirty air.
    h. If damper alarm sounds - perform above login steps to clear.
    i. If alarms continue to sound even after all the above has been tried, you may need to replace your smoke detector. Call RoboVent at 888-762-6836 for support.

*This is a recommendation only. In the event of a fire, follow your state/local/company firefighting procedures.

FIGURE 68

HMI Communication Errors

To begin the troubleshooting process for communication issues, you will need two auxiliary CAT 5 cables (recommend 6ft length, industry standard). (see Figure 68).

Test 1

Once you have your auxiliary cables, you can begin the testing. You will need to start at the HMI (remote touch screen) and check to see if the IP address is correct. This will depend on if you started to experience the issues after a replacement HMI screen or PLC.

You will need to get the last two numbers of the unit Serial Number prior to doing the IP address validation (this can be located on the side of the HMI or on the bottom left of the main control panel door).

On the main ePad HMI home screen, there is a hidden page that you can access by pressing the upper right corner and then the lower left corner. Keep in mind that there are no buttons or icons visible when trying to access this screen. Once you can access, continue.

If you have done the IP address validation and it is still having communication issue, we can move on to the next test.

Tools/equipment:

- 8mm allen tool
- Philips screwdriver
- Ladder/Lift

First, you will need to remove the HMI screen cover from the enclosure box using a Philips screwdriver to remove the 4 screws holding it on. You should turn off power because once its removed and disconnected, if power is left on the unit alarm will sound.

FIGURE 69

FIGURE 70

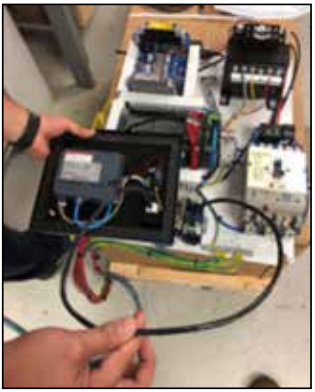


FIGURE 71

Test 2

1. Remove the existing cable attached just below the Estop. (see Figure 69).
2. Take the HMI controller to the main control panel (you will need your ladder or lift along with the 8mm Allen tool to open the control door).
3. Take one of the two patch cables and plug into the port below the Estop.
4. Identify the ASI ethernet port in the main control panel and remove the data cable. (see Figure 70).
5. Take the other end of the patch cable and attach to the ASI port (once this is connected your screen should power up when power is turned on).

Turn on the power and verify if the communication has regained connection or it is still having issues.

6. If the communication is regained your Cat 5 cable from the ASI to the HMI is damaged causing the issue.
7. If you are still experiencing communication issues leave the existing cable attached to give the HMI power. (see Figure 71).

FIGURE 72

Test 3

For the last test, you will need to remove your patch cable that runs from the PLC to the ethernet switch. Then, remove the blue cable that runs to the HMI and insert the 1st end of the patch cable into that now open port. (see Figure 72).

1. Leave the cable that you removed from the PLC ethernet position off and attach the 2nd end of the patch cable into the ethernet position on the PLC shown in Figure 73.
2. If this resolves your communication, you will need to replace the Ethernet switch.
3. If the communication issue continues you will need to replace all the components for communication because there is a PLC, or HMI issue and no way of knowing if the other components are truly functioning properly.

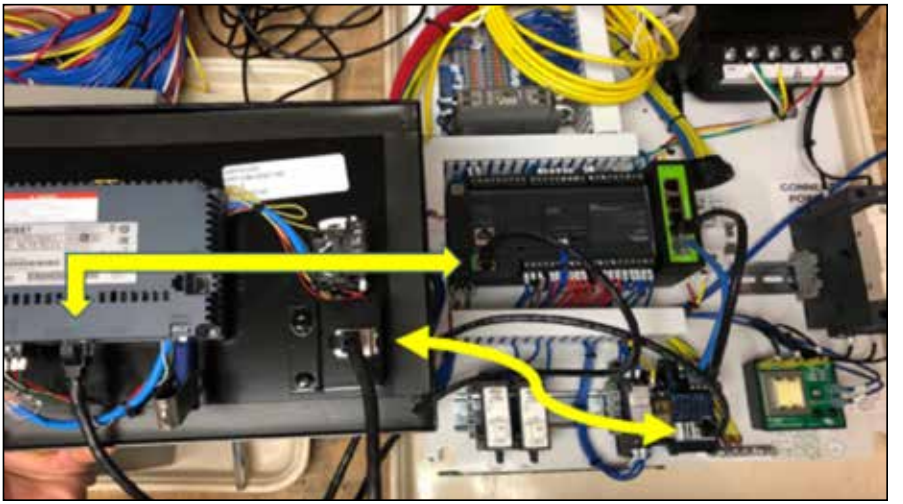
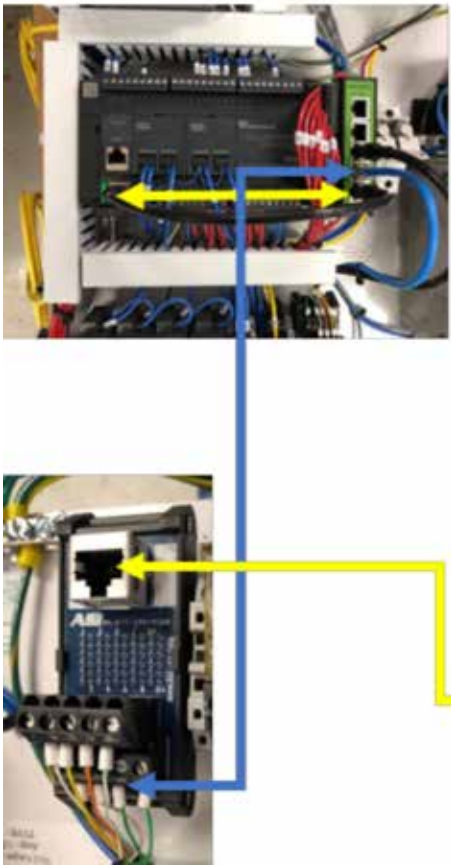


FIGURE 73

Communication components:

PART #	DESCRIPTION
PLC-ETEL	Programmable logic Controller (PLC)
ELEC-257	1' Cat 5 Ethernet Cable
IES-5TX-ETEL	Industrial Ethernet Switch 5TX
WHIP-XX-C	Ethernet connection cable extending from HMI control screen box to PLC. Enclosed in Sealtite.
HMI-EPAD	HMI Screen, Enclosure box, and Estop control button, assembled and programmed.
HMI-WHIP	Ethernet whip on RJ45 connector that goes from the connector to the HMI screen port.



If you are unable to identify the source of your communication errors after completing this troubleshooting process, please contact RoboVent customer service for additional support.

APPENDIX A

Barrel Level Sensor Instruction Manual

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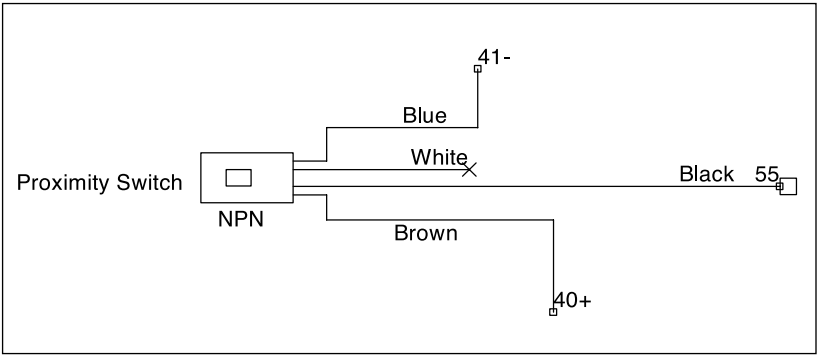
APPENDIX A

Barrel Level Sensor - Option

The addition of the Barrel Level Sensor option provides a much more visible notification and warning to the operator or maintenance personnel that the Collection Drum or Barrel under the hopper is becoming full of particulate and needs to be emptied out.

Field Connection / Installation:

1. The senor cable is protected inside a Sealtite flexible conduit. Once the Collector is assembled and installed in its correct location, the Sealtite conduit needs to be connected to a knockout hole in the side of the control panel area
    a. Remove the appropriate knockout hole from the side of the control panel area
    b. Pass the sensor wires through the hole
    c. Fasten the Sealtite elbow fitting to the hole to make a waterproof connection
2. Connect the wires to the correct terminals in the terminal strip on the control panel as per wiring diagram below.



Operation:

1. When dust and particulate builds up to the level of the sensor inside the Drum, the sensor sends a signal to the Controller, and the 'Collection Drum Full' message is displayed on the Service Messages page, on the ePad screen (HMI).

Barrel Level Sensor - Option

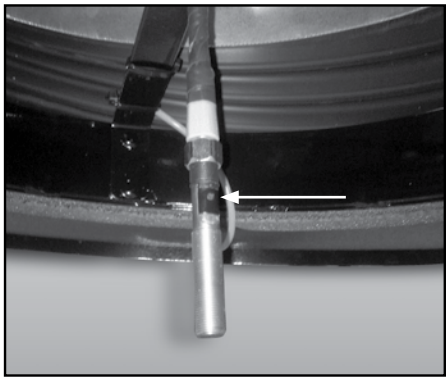
2. Once the Drum has been emptied out and replaced under the hopper, the message can be cleared by logging-in with the Username 'Service' and the associated password. Once logged in and on the Service Message screen, the 'Drum Reset' button will be displayed (see picture) which when pressed will clear and reset the 'Collection Drum Full' message.

Adjustment:

Due to the many different types of application and types and densities of dusts can be collected, a minor adjustment maybe required to the sensor to ensure reliable operation;

1. If the sensor is activated prematurely (not much dust in the drum), then the sensitivity of the sensor should be reduced, by turning the adjustment screw on the side of the sensor (see picture). Adjust in small increments until the correct operation is achieved.

2. If the sensor is not activated even when the dust has filled the drum and come in contact with the sensor, then the sensitivity of the sensor should be increased, by turning the adjustment screw on the side of the sensor (see picture). Adjust in small increments until the correct operation is achieved.



Maintenance:

Periodically inspect the following:

1. The sensor head is not damaged
2. There are no exposed electrical wires
3. The sensor is securely fastened in its quick-connect plug
4. There is not excess length of cord pulled through the mounting bracket inside the drum lid, causing the sensor to protrude too far into the collection drum
5. Fittings on the Sealtite connections are still tight and secure

APPENDIX B

General Wiring Diagrams

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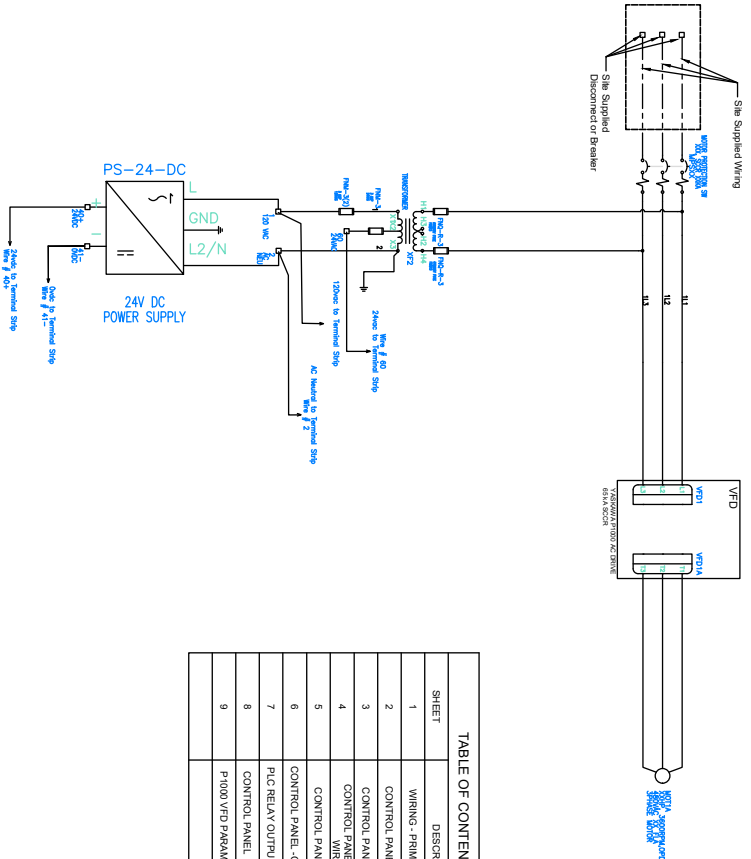
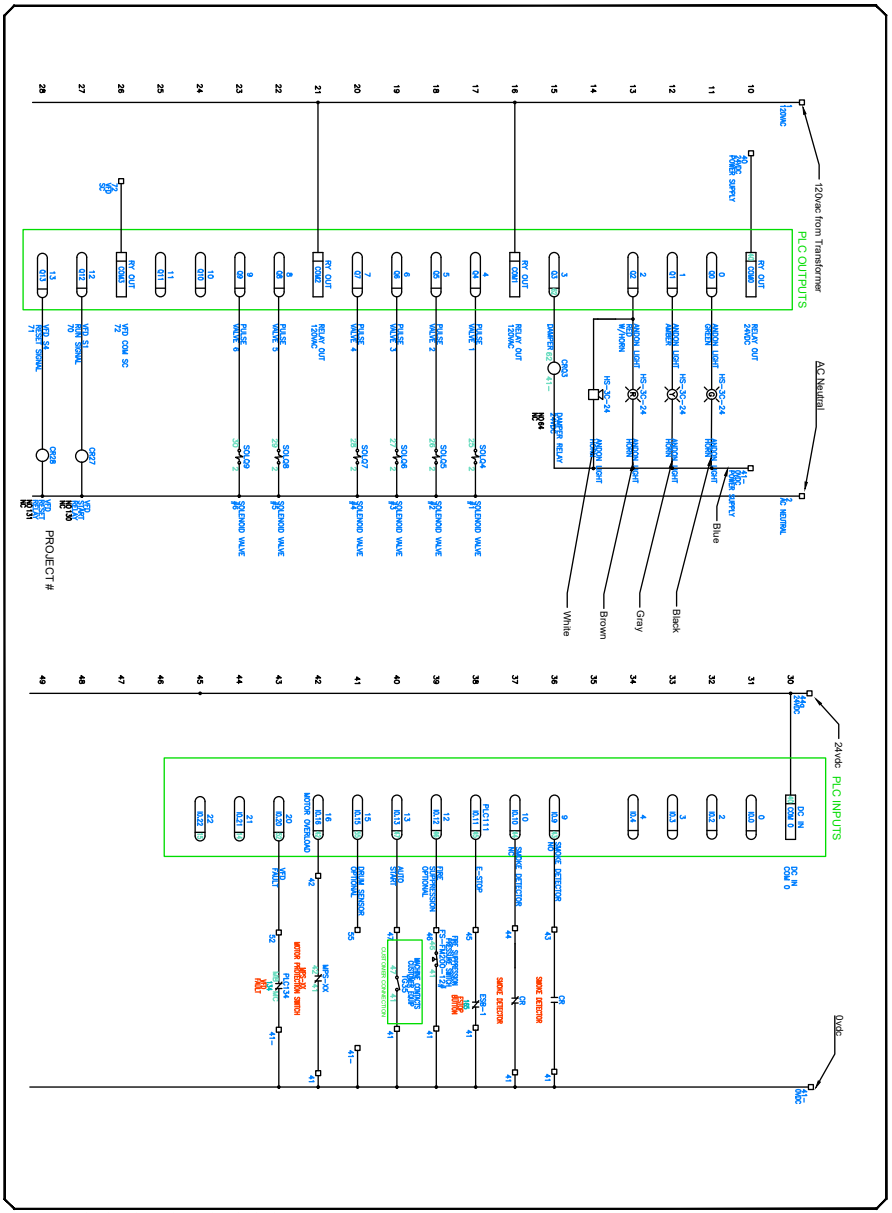
Wiring Diagram - ePad Wiring

Primary Wiring



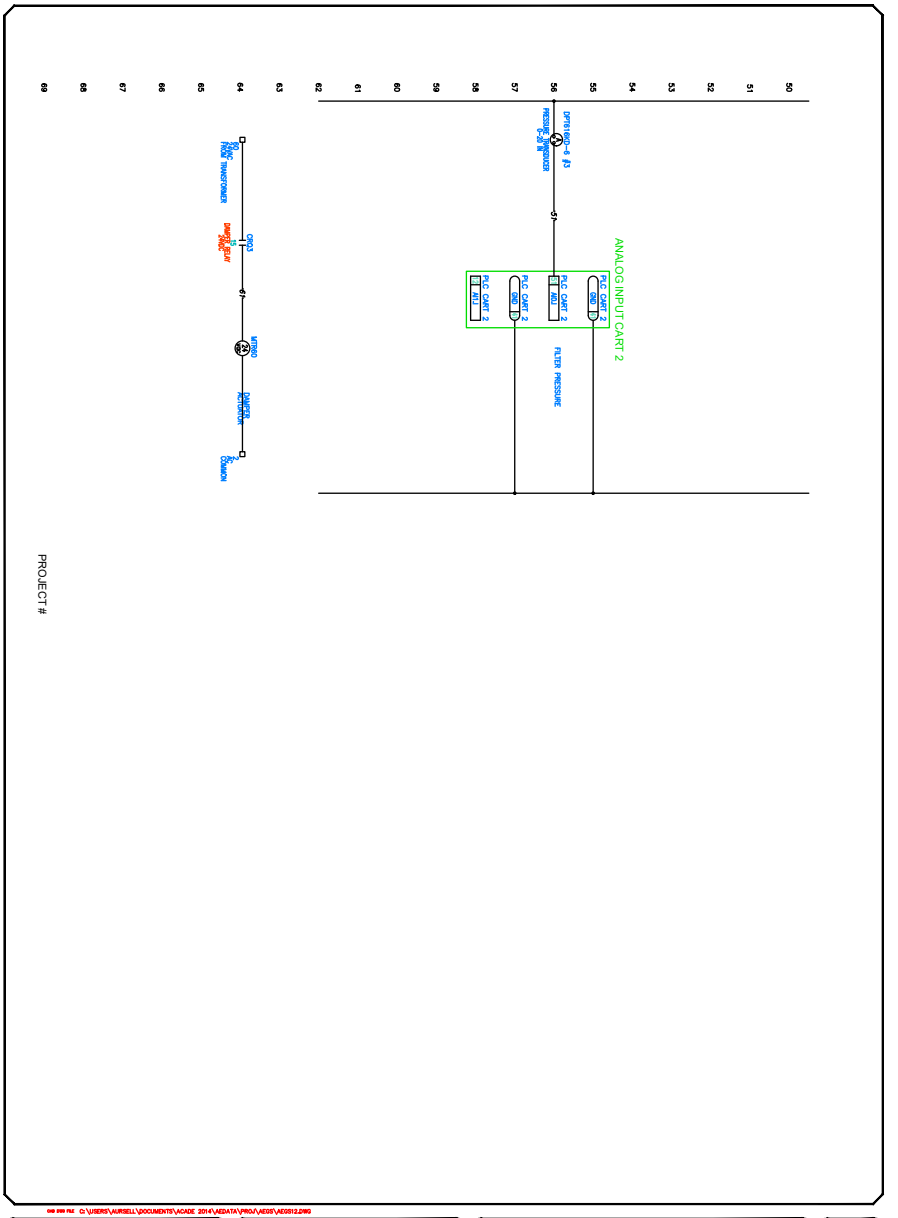
Wiring Diagram - ePad Controls

Control Panel Wiring Schematic / PLC Wiring



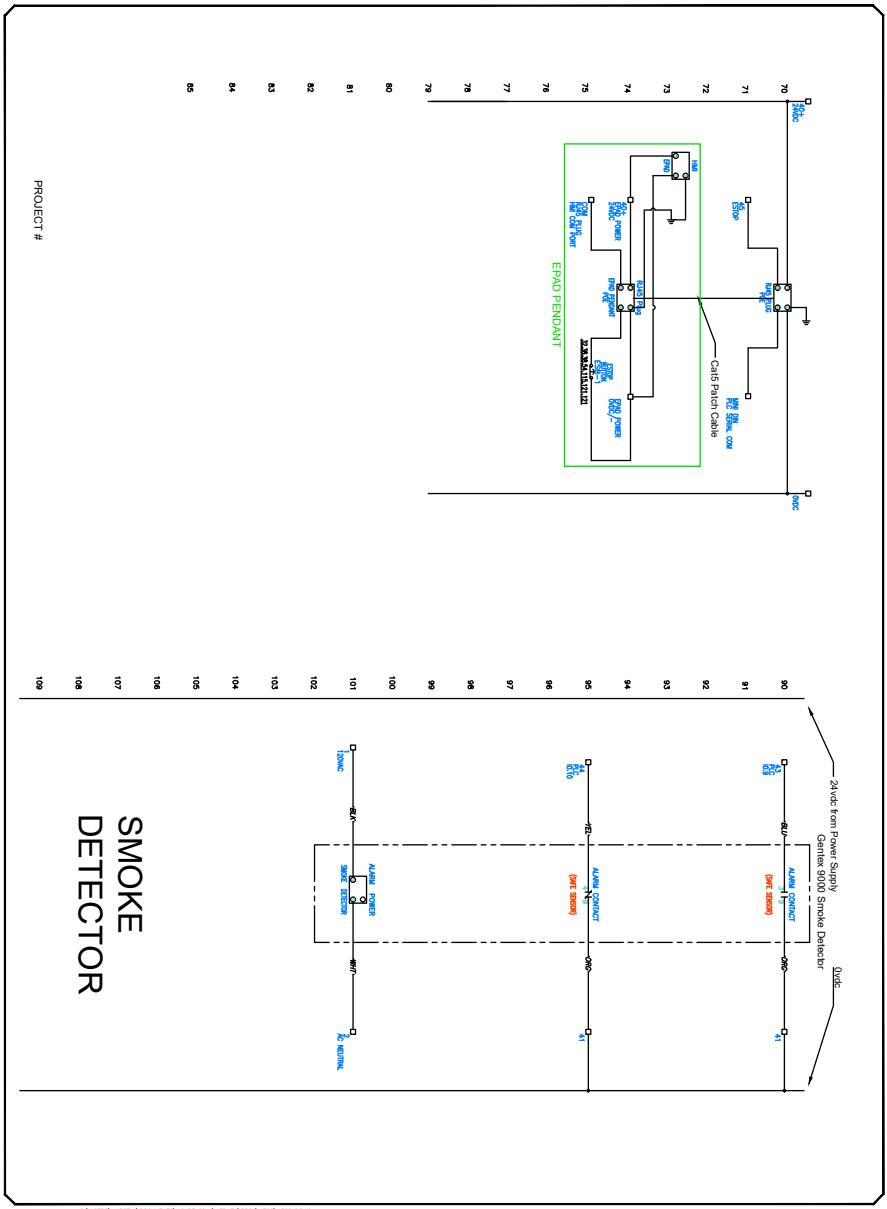
Wiring Diagram - ePad Controls

Control Panel PLC Wiring



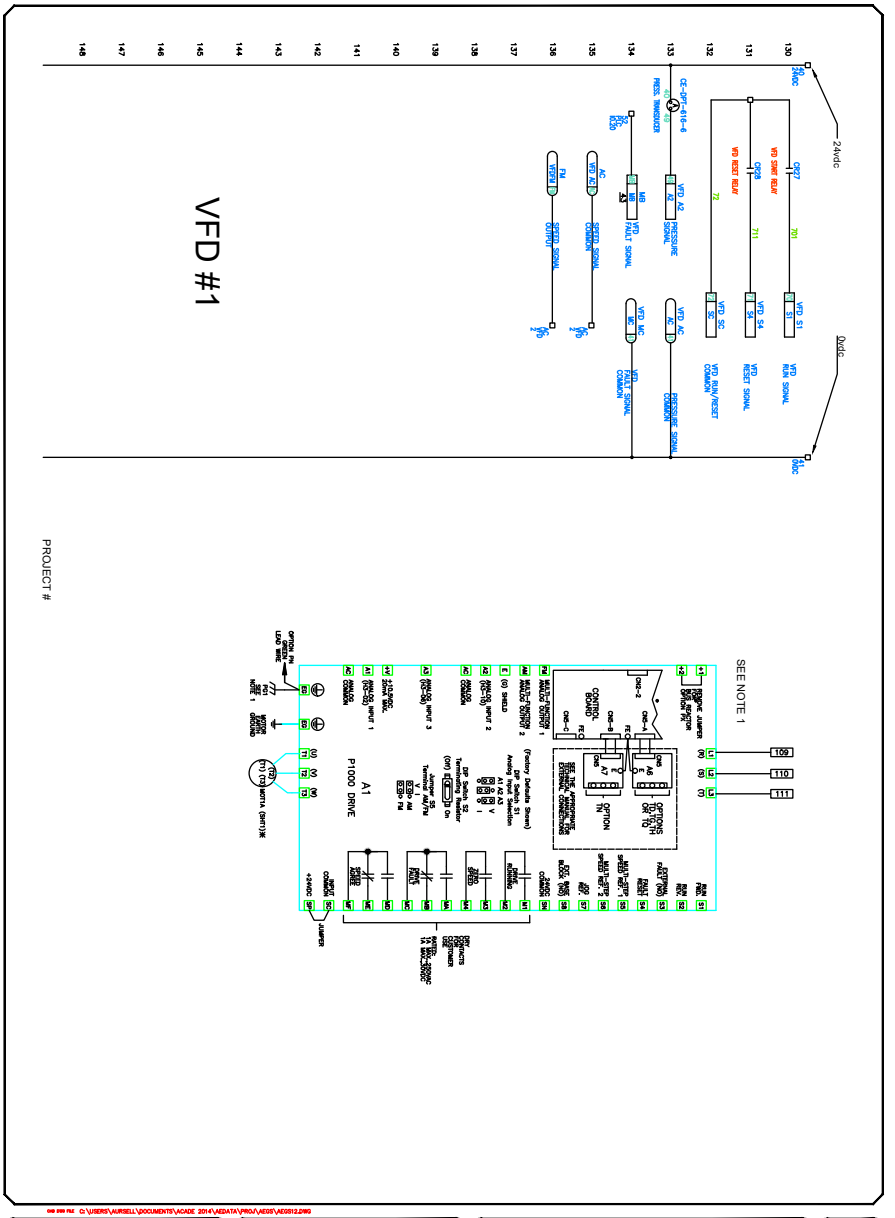
Wiring Diagram - ePad Controls

PLC Wiring



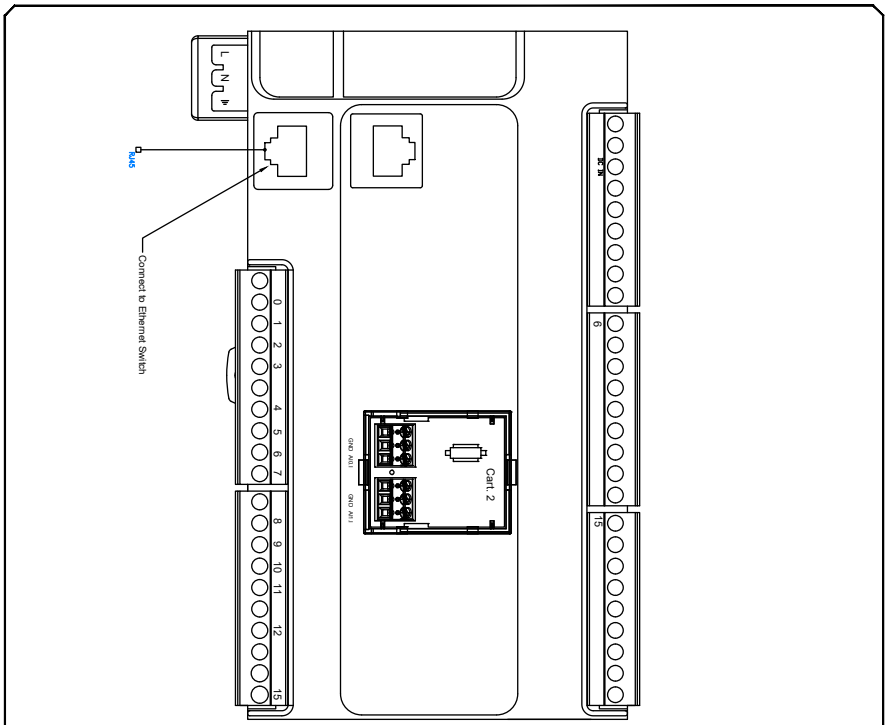
Wiring Diagram - ePad Controls

Control Wiring



Wiring Diagram - ePad Controls

VFD Wiring



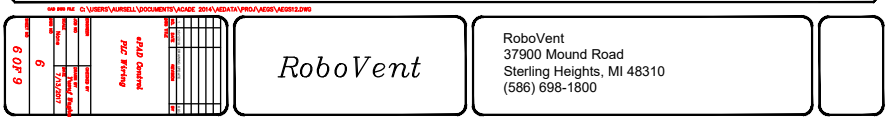
RoboVent PLC Wiring - Input

Terminal #	Wire #	Desc.	Notes
DC IN	40*	24vdc power	
9	43	Safe Sensor NO	
10	44	Safe Sensor NC	
11	45	E-Stop	
12	46	Fire Supp. Tank	Optional Freelance Monitor
13	47	Remote Start	
15	55	Drum Monitor	Optional
16	42	Motor Overload NC	
20	52	VFD Fault NC	

RoboVent PLC Wiring - Output

Terminal #	Wire #	Desc.	Notes
L	1	120vac	
N	2	0vac	
gnd	none	Ground	
RY OUT COM 0	40+	24vdc	
0	Black	Green Andon Light	
1	Gray	Amber Andon Light	
2	Brown / White	Red Andon Light/Horn	
3	62	Damper	
COM1	1	120vac	
4	25	Pulse Valve #1	
5	26	Pulse Valve #2	
6	27	Pulse Valve #3	
7	28	Pulse Valve #4	
COM2	1	120vac	
8	29	Pulse Valve #5	
9	30	Pulse Valve #6	
COM3	72	VFD Control Signal Common	SN on VFD
12	70	VFD Run Signal	S1 on VFD
13	71	VFD Reset Signal	S4 on VFD

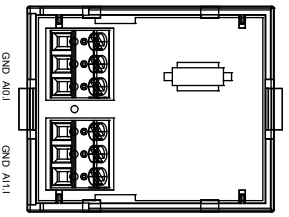
PROJECT #



Wiring Diagram - ePad Controls

Cartridge Wiring

Analog Input
Cartridge 2



RoboVent PLC Wiring - Input Analog Cart 2

Terminal #	Wire #	Desc.	Notes
GND	41-	0vdc	
AI0.1	51	4-20ma	Filter Pressure

PROJECT

ePAD Control Panel Cartridge Wiring

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Wiring Diagram - ePad Controls

Wiring Notes

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Part Number	Manufacturer Part Number	Manufacturer	Description	Qty
M-TR-XXHP-ODP	GT00XX	MARATHON	Motor XXHP,3600 RPM, 3PH,480V	1
ED-XX-480	CIMR-PU4AXXXX	YASKAWA	Variable Frequency Drive, P1000, XXHP	1
DPT-616KD-D6			Differential Pressure Transmitter	2
HMI-DTS			ePad Touch Screen Assembly 3.5	1
HMI-ENC-XE			ePad HMI Enclosure	1
ESB-1			Stop Button	1
ESL-P-1			Stop Legend Plate	1
PS-24-DC			Power Supply	1
W-CBL-8			Cable for EPAD	1
HS-3C-24	K50LGRAL1VPQ3979478)	BANNER	EZ-Light Indicator Horn Strobe	2
	EHCC	EDISON	Fuse, 3A, CL CC, UL Fuse Holder, CL CC, UL	3
ELEC-323	RV8H-L-AD24-IDEC	IDEC	Relays, 3, 24VAC/DC,	2
ELEC-1016	PDBFS220	BUSSMANN	Distribution Block, 1P, 220A, UL	3
T-350-120/24	X4350PSF1-ABBG		Transformer/Power- 350VA,	1
MPS-XX	SQD	SCHNEIDER	Motor Protection Switch	1
BMD-XX		ABB	Panel Disconnect	1
PLC-ETTEL	SQDTM221CE40R	SCHNEIDER	PLC Controller	1
AIC-ETL	SQDTMK2A12	SCHNEIDER	Analog Input Cartridge	1
ES-5TX-ETEL	KY-5610G		Industrial Ethernet Switch, 5TX	1
GPC-012I	MRJ0845		DIN Rail Mounted Interface	1
ELEC-112	SJZ-S-07LW-IDEC	IDEC	Relay, 24V	1
ELEC-158	RJS-C-A24-IDEC	IDEC	RELAY, 24V	1
SD-120-91	GEN012SF	GENTEX CORP	SafeSensor(Smoke Detector)	1
ELEC-1010	EHCC10U	EDISON	Fuse Holder, 1P, CL CC, UL	2

RoboVent Electrical Ratings

Serial Number	
Motor Size	XX hp
Amperage	XX FLA
Voltage	480vac
	3 phase

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ePAD Control Panel Wiring Notes

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Wiring Diagram - ePad Controls

Wiring Notes

Setting for P1000 VFD													
Parameter #	Parameter Name:	Set to:											
O4-17	Time Setup	Set to current time											
A2-01	User Parameter	b5-19 PI Setpoint			Motor FLA @ 460 Volts				P1000 OUTPUT CURRENT				
B1-03	Stopping Method	0: Ramp to Stop			3 HP	4.8 Amps			3 HP			5.4 Amps	
B2-01		7hz											
B2-04		7sec											
B3-01	Speed Search	1: Enabled			5 HP	7.6Amps			5 HP			8.8mps	
B3-24	Speed Search mode	1: Speed Sensing			7.5 HP	11Amps			7.5 HP			11.1Amps	
B5-01	PI Mode	1: Enabled			10 HP	14Amps			10 HP			17.5Amps	
B5-02	Gain	1			15 HP	21Amps			15 HP			23Amps	
B5-03	Integral Time	5			20 HP	27 Amps			20 HP			31Amps	
B5-05	PID D Time	1			25 HP	34 Amps			25 HP			38Amps	
B5-08	PI Delay Time	1.00 sec			30 HP	40 Amps			30 HP			44 Amps	
B5-12	Fb Lss Det Sel	0: Disabled			40 HP	52 Amps			40 HP			58 Amps	
B5-13	Fb Lss Det Lvl	0.03			50 HP	65 Amps			50 HP			65 Amps	
B5-14	Fb Lss Det Time	25.0 sec			75 HP	96 Amps			75 HP			103 Amps	
B5-18	PI Setpoint Selection	1: Enabled			125 HP	156 Amps			125 HP			165 Amps	
B5-19	PI Setpoint	10											
C1-01	Acceleration	30											
C1-02	Deceleration	30							P1000 INPUT CURRENT				
D2-02	Lower Speed limit	30							3 HP			5.9	
E2-01	Full Load Amps	Set to motor FLA							5 HP			9.4	
H2-02	Term M3 Fault Reset	11							7.5 HP			14	
E2-04	# of Motor Poles	2							10 HP			20	
H3-09	A2 Signal Level Selection	2: 4 to 20mA Input							15 HP			24	
H3-10	A2 Function Selection	b:PID Feedback							20 HP			38	
H3-13	Filter Avg Time	2.00 sec							25 HP			44	
H4-01		101							30 HP			52	
L1-01	MOL Fault Select	1							40 HP			58	
L2-03		10sec							50 HP			71	
L5-01	Fault reset trys	5							60 HP			86	
O2-06	Oper Detection	0							75 HP			105	
For Multi Step Speed reference									125HP			170	
Wire signal to S-5 and jumper S-5 to S-6													
H1-05	S-5 Multi Step Speed Reference	3											
D1-02	Speed Reference	60											
H1-06	PID Disable	19											
H3-06	Speed Reference activation	0											

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ePAD Control Panel Wiring Notes

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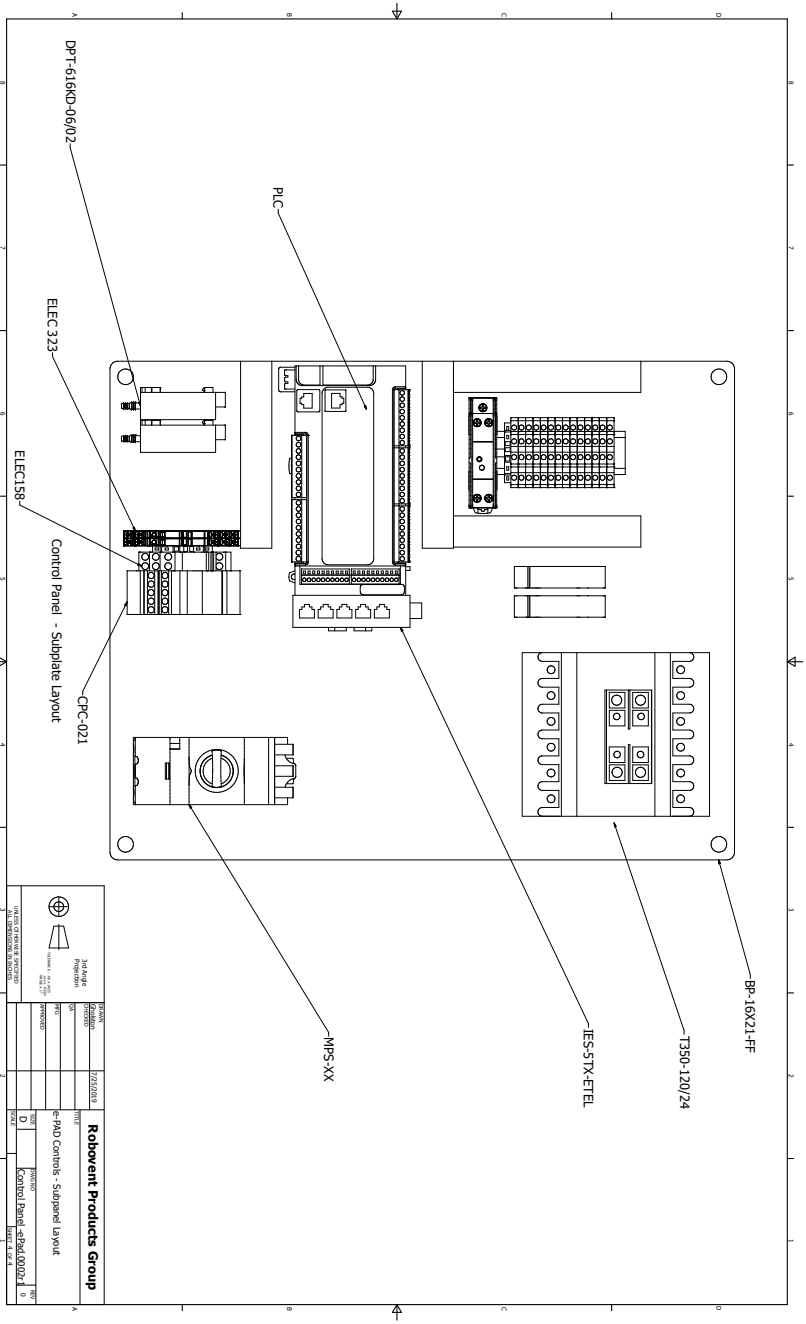
Wiring Diagram - ePad Controls

Subpanel Layout



APPENDIX C

Parts List

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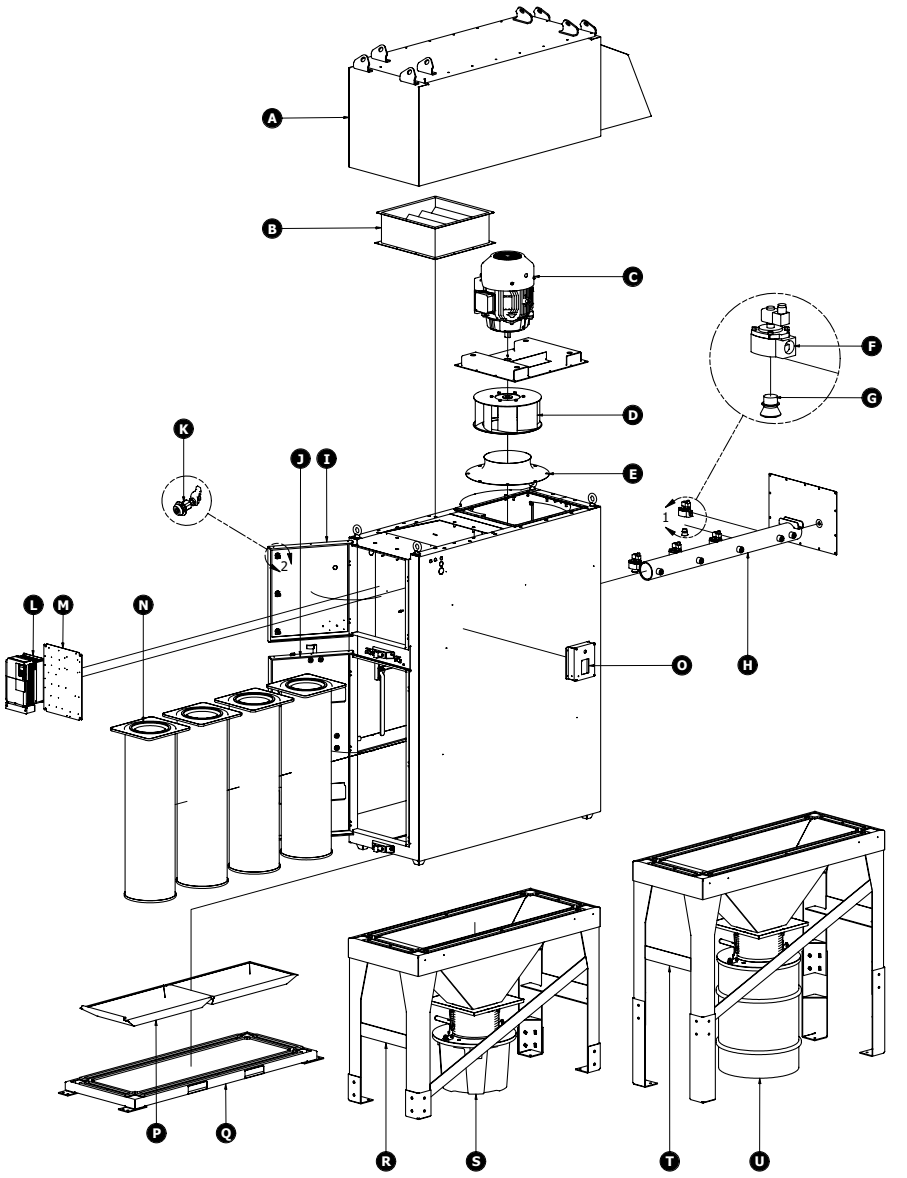
Parts List



Parts List

DT4-8000-4

ITEM	QTY	PART NUMBER	DESCRIPTION
A	1	AFP-DT4-4	Silencer Plenum
B	1	DAMP-DT4-4	Exhaust damper
C	1	MTR-10-ODP	Motor may vary due to design
D	1	M2040	20" 40% blower wheel, varies due to design
E	1	MV20	20" venturi
F	4	DV-10-TU	Pulse Valve
G	4	NS-SPR-200	Pulse Jet cone
H	1	DT4-TANK-8	Air tank
I	1	DT4-MC-4 Door Panel	Door Panel, motor cabinet
J	1	DT4-FC-4 Door Panel	Door Panel, Filter cabinet
K	3	DL-8	8mm door latch
L	1	ED-10-480	eDrive, Size will vary with design
M	1	BP-16x21-FF	Control Panel back plate
N	4	EX3-16D52-A15-SF	A15 Endurex Filter, Square flange
O	1	HMI-EPAD	ePad Touchscreen controller and enclosure
P	1	DT4-4-DT-000	Dust Tray for 4 cartridge unit
Q	1	DT4-DT4-4-BP-000	Base Plate for Dust Tray 4 cartridge unit
R	1	HSD-DT4-4	Hopper Short Drum/legs
S	1	DR-20	20 gallon drum
T	1	HLL-DT4-4	Hopper Long legs
U	1	DTS-55-DR	55 Gallon drum

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Parts & Service

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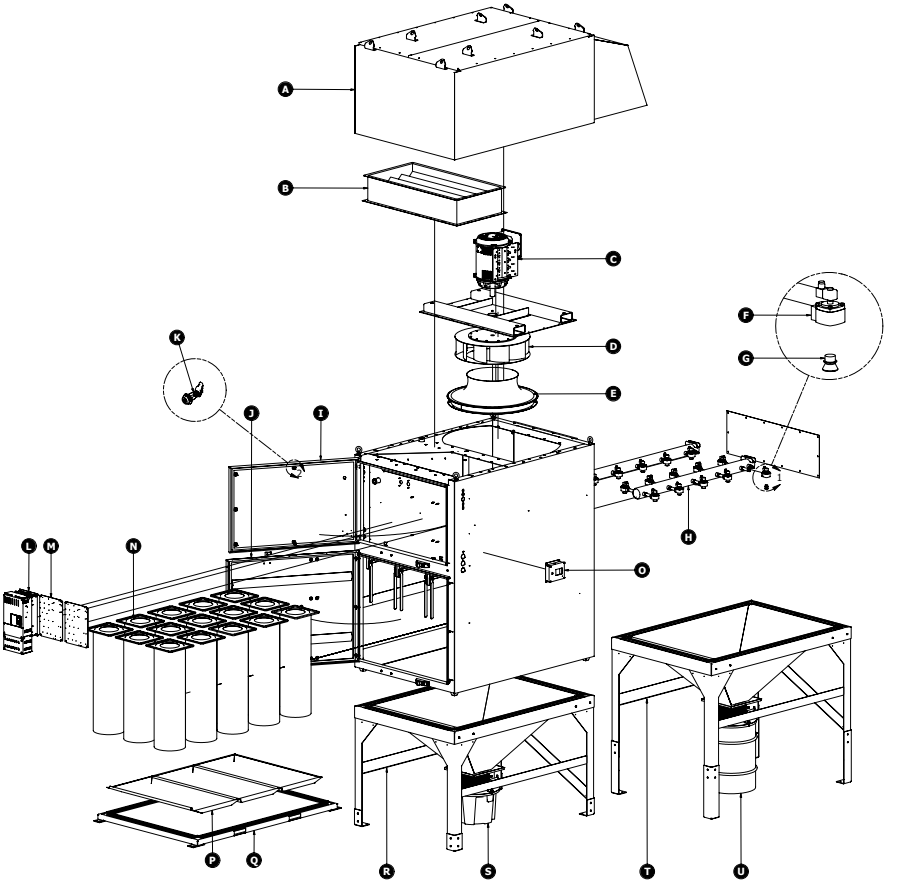
Parts List



Parts List

DT4-22500-15

ITEM	QTY	PART NUMBER	DESCRIPTION
A	1	AFP-DT4-15	Silencer Plenum
B	1	DAMP-DT4-15-LG	Exhaust damper
C	1	MTR-50-1800-ODP	Motor may vary due to design
D	1	M3668	36"68% blower wheel, varies due to design
E	1	MV36	20" venturi
F	15	DV-10-TU	Pulse Valve
G	15	NS-SPR-200	Pulse Jet cone
H	1	DT4-TANK-10	Air tank
I	1	DT4-MC-15-LG-019	Door Panel, motor cabinet
J	1	DT4-FC-15 Door Panel	Door Panel, Filter cabinet
K	5	DL-8	8mm door latch
L	1	ED-50-480	eDrive, Size will vary with design
M	2	BP-16x21-FF	Control Panel back plate
N	15	EX3-16D52-A15-SF	A15 Endurex Filter, Square flange
O	1	HMI-EPAD	ePad Touchscreen controller and enclosure
P	1	DT4-15-DT-LG	Dust Tray for 15 cartridge unit
Q	1	DT4-DT4-15-BP-001	Base Plate for Dust Tray 4 cartridge unit
R	1	HSD-DT4-15	Hopper Short Drum/legs
S	1	DR-20	20 gallon drum
T	1	HLL-DT4-15	Hopper Long legs
U	1	DTS-55-DR	55 Gallon drum

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