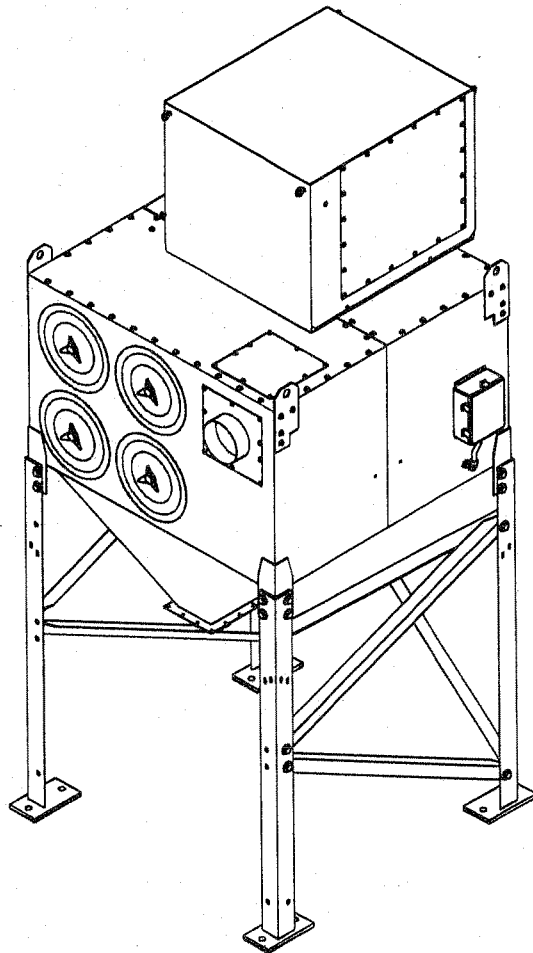
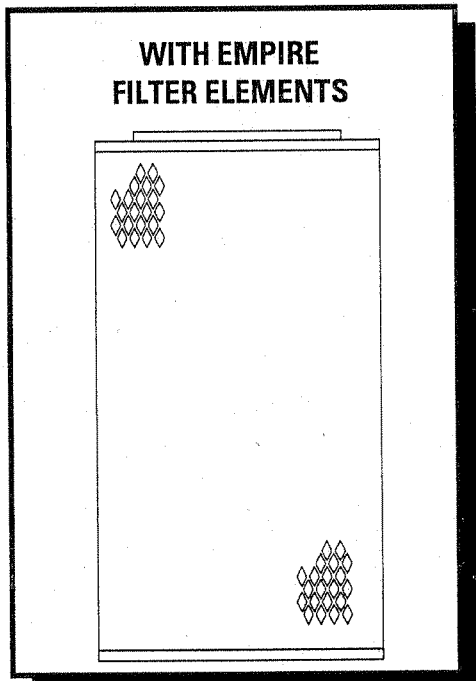


Empire Abrasive Equipment Company Installation and Operation Manual

CARTRIDGE FILTER DUST COLLECTOR SYSTEM EM 2-2, EM 2-4
Includes Installation, Operation, and Service Instructions



IMPORTANT

This manual contains specific precautionary statements relative to worker safety in appropriate sections. Read this manual thoroughly and comply as directed. It is impossible to list all of the potential hazards of dust control equipment. It is imperative that use of the equipment be discussed with an EMPIRE ABRASIVE EQUIPMENT COMPANY representative. Personnel involved with the equipment or systems should be instructed to conduct themselves in a safe manner.

NOTE

Statements indicate precautions necessary to avoid potential equipment failure.

CAUTION

Statements indicate potential safety hazards.

CAUTION

APPLICATION OF DUST CONTROL EQUIPMENT:

- Special care must be exercised in the use of dust collection equipment when combustible equipment, such as buffing lint paper, wood dust, aluminum, and magnesium are present. These materials may present a fire or explosion hazard. A prudent user of EMPIRE equipment should consult and must comply with all National and Local Fire Codes and/or other appropriate codes when determining the location and operation of dust collection equipment.
- Under no conditions should anyone, including the machine operator, be allowed to put burning objects or lit cigarettes into the hood or ducting of any dust control system.
- Avoid mixing combustible materials with dust generated from grinding of ferrous metals due to the potential fire hazard caused by sparks being pulled into the dust collection equipment.
- When collection equipment is used to collect flammable or explosive dusts, the dust collection equipment should be located outside the building. Also, an installer of fire extinguishing equipment, familiar with this type of fire hazard and local fire codes, should be consulted for recommendations and installation of the proper fire extinguishing equipment. Empire equipment does NOT contain fire extinguishing equipment.
- Explosion relief vents are required on some applications. Consult with an insurance underwriter or a NFPA Manual to determine proper vent sizing requirements. Vents installed on dust collection equipment within a building must relieve to the outside of the building to minimize chances of a secondary explosion. Consult the proper authority to determine proper method of venting the dust collection equipment. Empire equipment does NOT contain explosion relief vents, except on special order.

Table of Contents

Notes and Cautions 2
 Data Sheet 3
 1.0 Introduction 5
 1.1 Operational Explanation 5
 1.1.1 Normal Operation 5
 1.1.2 Filter Cleaning 6
 2.0 Installation 6
 2.1 Inspection 6
 2.2 Ship Loose Items 6
 2.3 Equipment/Tools Required 6
 2.4 Pre-Installation 6-7
 2.5 Assembly of Standard Equipment 7
 2.5.1 Hopper Installation 7
 2.5.2 Leg Installation 9
 2.6 Assembly of Optional Equipment 11
 2.6.1 55-Gallon Drum Cover Pack With Slide Gate 11
 2.6.2 Photohelic®* Gage 11-12
 2.6.3 Inlet Collar Installation 14
 2.6.4 Blower Fan Mounting Instructions 14-15
 2.7 Electrical Installation 17
 2.8 Installation—Compressed Air Supply 18
 3.0 Pre Start-Up Check 18
 4.0 Start-Up 18-19
 5.0 Routine Maintenance 19
 5.1 Operating Checks 20
 6.0 Service 20
 6.1 Filter Element Removal 20
 6.2 Filter Element Installation 21
 6.3 Dust Removal (55-Gallon Drum Only) 21
 6.4 Original Equipment Filter Element 21
 6.5 Compressed Air Components 22
 7.0 Troubleshooting Guide 24-27
 Parts Ordering Information 28

Figures

Figure 1 - Typical Installation View 4
 Figure 2 - Operational Schematic 5
 Figure 3 - Hopper Installation 8
 Figure 4 - Leg Positioning and Crossbracing
 Standard Leg Packs—Front View 8
 Figure 5 - Parts Drawing/Leg Bolting Details 10
 Figure 6 - Hose Drum Cover Pack with Gate 11
 Figure 7 - Photohelic Gage Wiring Diagram 12
 Figure 8 - Installation of Photohelic Gage 13
 Figure 9 - Installation of Inlet Collar 14
 Figure 10 - Blower Assembly 15
 Figure 11 - EM 2-2 Solid State Wiring Diagram 16
 Figure 12 - EM 2-4 Solid State Wiring Diagram 16
 Figure 13 - Filter Element Replacement 23

* Magnehelic and Photohelic are registered trademarks of Dwyer® Instruments, Inc.

DATA SHEET

Customer Name _____	Installation Date _____
Address _____	
Shipping Date _____	Serial Number _____
Model Number _____	
Cartridge filter _____	
Accessories _____	
Other _____	

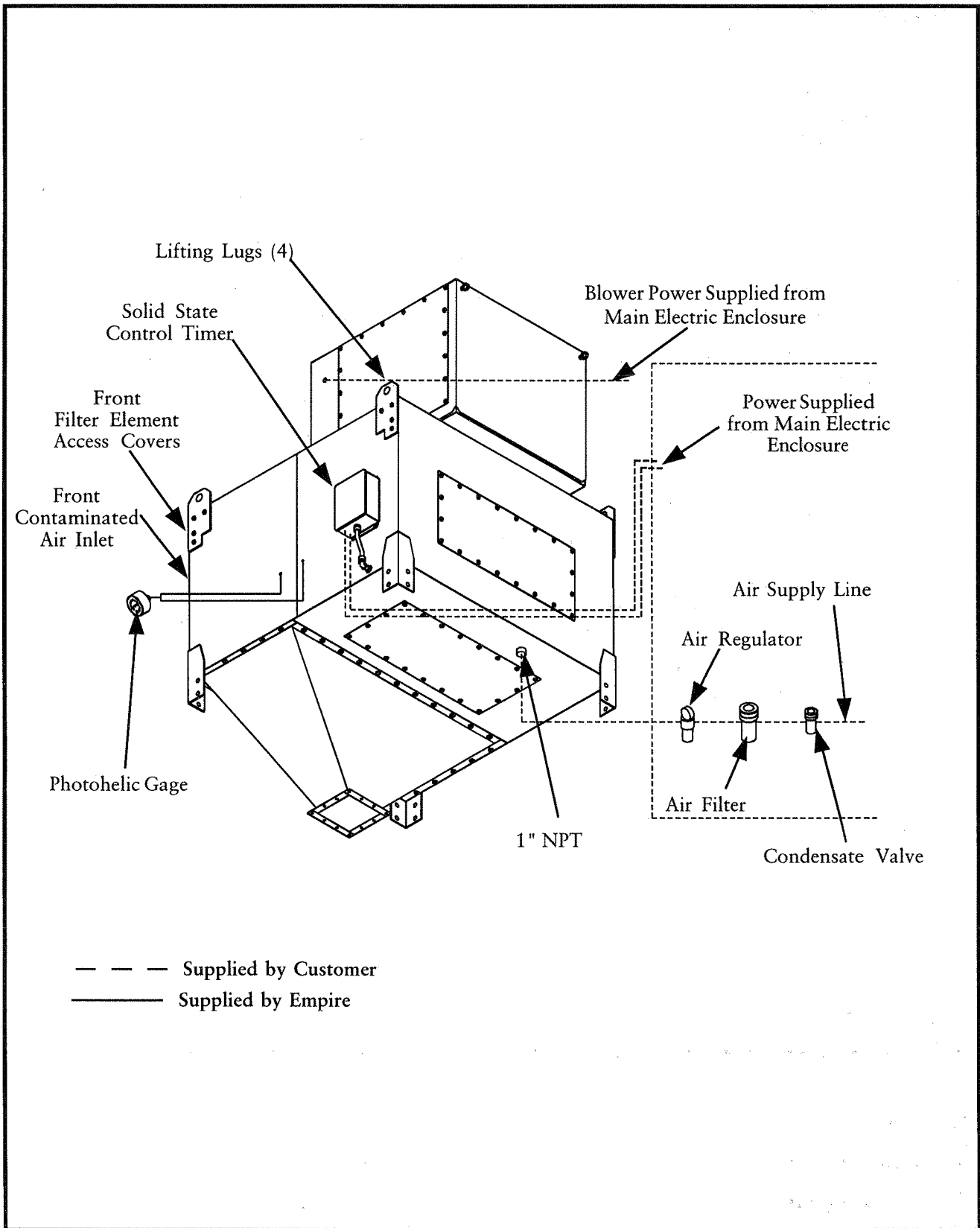


Figure 1
Typical Installation View
(Model EM 2-4 Shown)

1.0 Introduction

The Empire cartridge filter dust collector is used for the collection of airborne dust and particulate. Whether in answer to the problem of air pollution, or as part of a manufacturing process, the collector provides highly efficient, continuous, on-line dust collection.

The Empire filter elements are the heart of the dust collector. These filter elements help ensure that only clean air is returned to the plant environment.

Technical and field support are always available from your local Empire distributor.

1.1 Operational Explanation (See Figure 2)

1.1.1 Normal Operation

During normal operation, contaminated air enters the dust collector through the front inlet and through the filter elements. Dust is collected on the outside surface of the filter elements. The clean, filtered air flows through the center of the filter elements into the clean air plenum, where it exits through the blower.

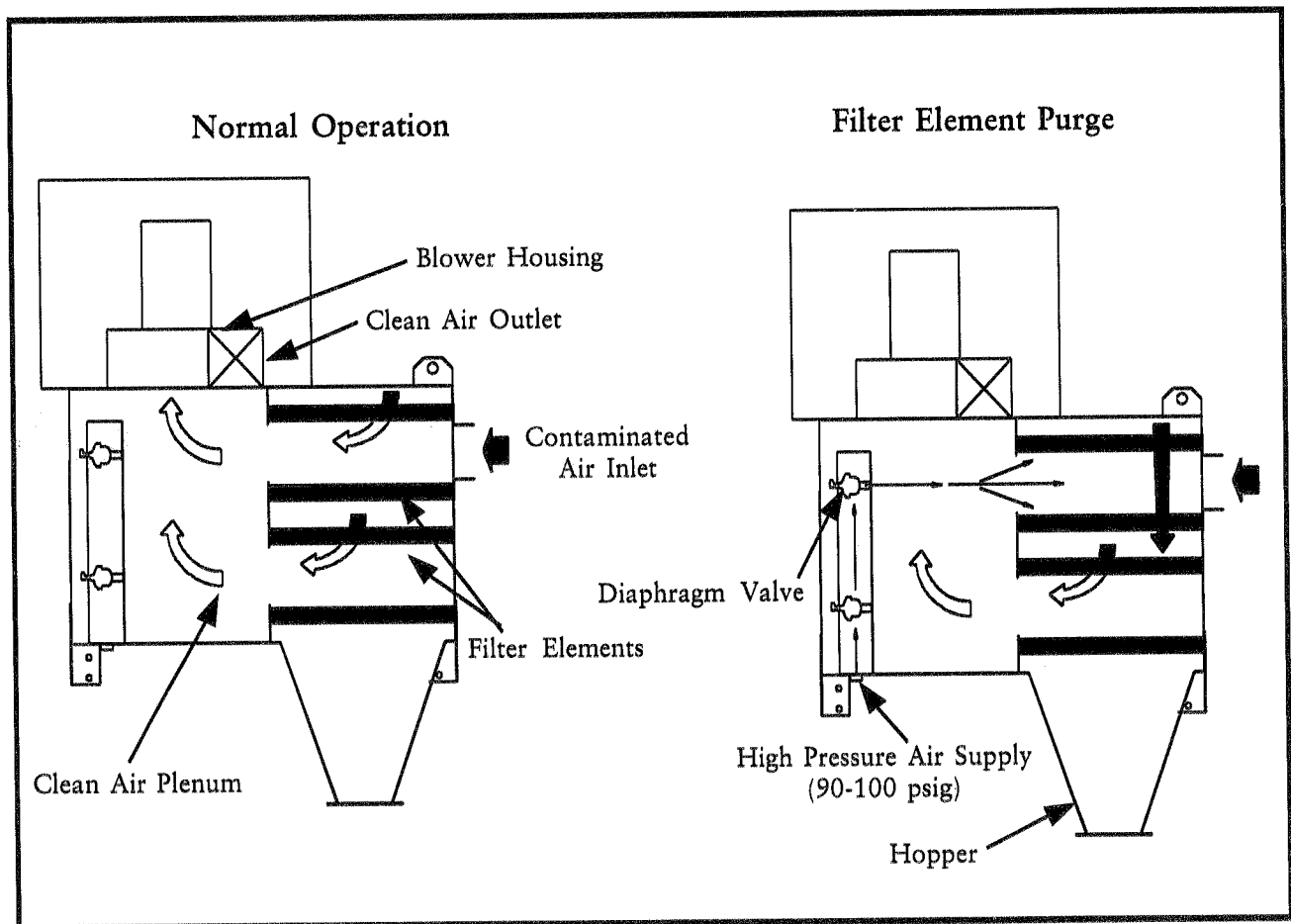


Figure 2
Operational Schematic

1.1.2 Filter Cleaning

Filter elements are cleaned automatically and sequentially. The result is that only one row (1 cartridge filter) may be off-line for cleaning at any given time.

During the filter cleaning purge, the solid state timer energizes a solenoid valve, causing the corresponding diaphragm valve to send a pulse of compressed air through the filter (from the inside outward), removing the collected contaminants from the outside surfaces of the filter. The dust falls into the hopper and then into the dust storage container.

2.0 Installation (See Figure 1)

2.1 Inspection

The dust collector is normally shipped by flat bed truck and should be checked for any damage that may have occurred en route. Any damage should be noted and the carrier notified immediately.

2.2 Ship Loose Items

Items shipped loose with the Empire dust collector may include:

- Hopper(s)
- Legs and Crossbracing
- 55-Gallon Drum Cover Pack
- Photohelic Gage
- Power Pack (Fan, Wheel, Housing, & Motor)
- Chamber Silencer
- Control Box (Timer)
- Hardware/Sealant
- Damper Pack
- Explosion Vent(s)

Most collectors are shipped with the cartridge filters installed.

2.3 Equipment/Tools Required

The following is a list of typical tools and equipment required to install and assemble an Empire unit.

- Crane/Lift Truck
- Slings/Spreader Bars/Clevis Pins
- Drift Pins
- Clamps
- Screwdrivers
- Pipe Wrenches
- Socket Wrenches
- End Wrenches
- Large Crescent Wrench
- Drill and Drill Bits
- Pipe Sealant
- Safety Glasses
- Hard Hat

2.4 Pre-Installation (See Figure 1)

The dust collector is usually mounted on a reinforced concrete foundation. However, roof mounting is also possible. When calculating for foundation or roof mounting, the weight of the dust collector plus the material being collected, and all auxiliary equipment must be considered together with wind, seismic, and other live loads. See the Specification Control Drawing for the dust collector weight.

CAUTION

Location must be clear of all obstructions such as utility lines or roof overhang (see Specification Control Drawing). A crane must be used to move the collector into position.

To avoid delay, install foundation in the proper location. Pay particular attention to the anchor bolt location. Anchor bolts must extend at least 1-3/4" above foundation. The collector should be located with consideration for emptying hopper storage area, filter replacement, shortest runs of inlet and outlet duct work, electrical and compressed air connections, and convenience of maintenance. In case of hazardous dust collection, consult with local authorities for the proper location of the dust collector.

2.5 Assembly of Standard Equipment (See Figure 1)

NOTE

A crane is recommended for unloading, assembly, and installation of the dust collector.

CAUTION

- Connect lifting sling to a minimum of four (4) cabinet lifting lugs.
- Distribute loads equally.
- Use clevises, not hooks on lifting sling.
- Use spreader bars on lifting sling.

Remove all crating and strapping from the unit. Remove all miscellaneous parts (bolts, nuts, etc.). Check the parts received against the packing slips. If there are parts missing, the carrier and your local Empire representative should be notified immediately.

NOTE

Each item to be attached to your collector is accompanied by a drawing that shows the attachment process. Refer to both the drawing and this manual when erecting your collector.

2.5.1 Hopper Installation (See Figure 3)

1. Stand the hopper up on the discharge end (hopper outlet).
2. Apply the sealant to the top flange all around toward the inside edge of the bolt pattern.
3. Lift the collector from the pallet. Position the collector over the hopper and lower slowly.
4. A set of drift pins will be helpful in pre-locating the holes for assembly.
5. Lower the collector onto the hopper flange and assemble them together with 3/8" thread-forming screws and flat washers. Tighten all hardware securely.

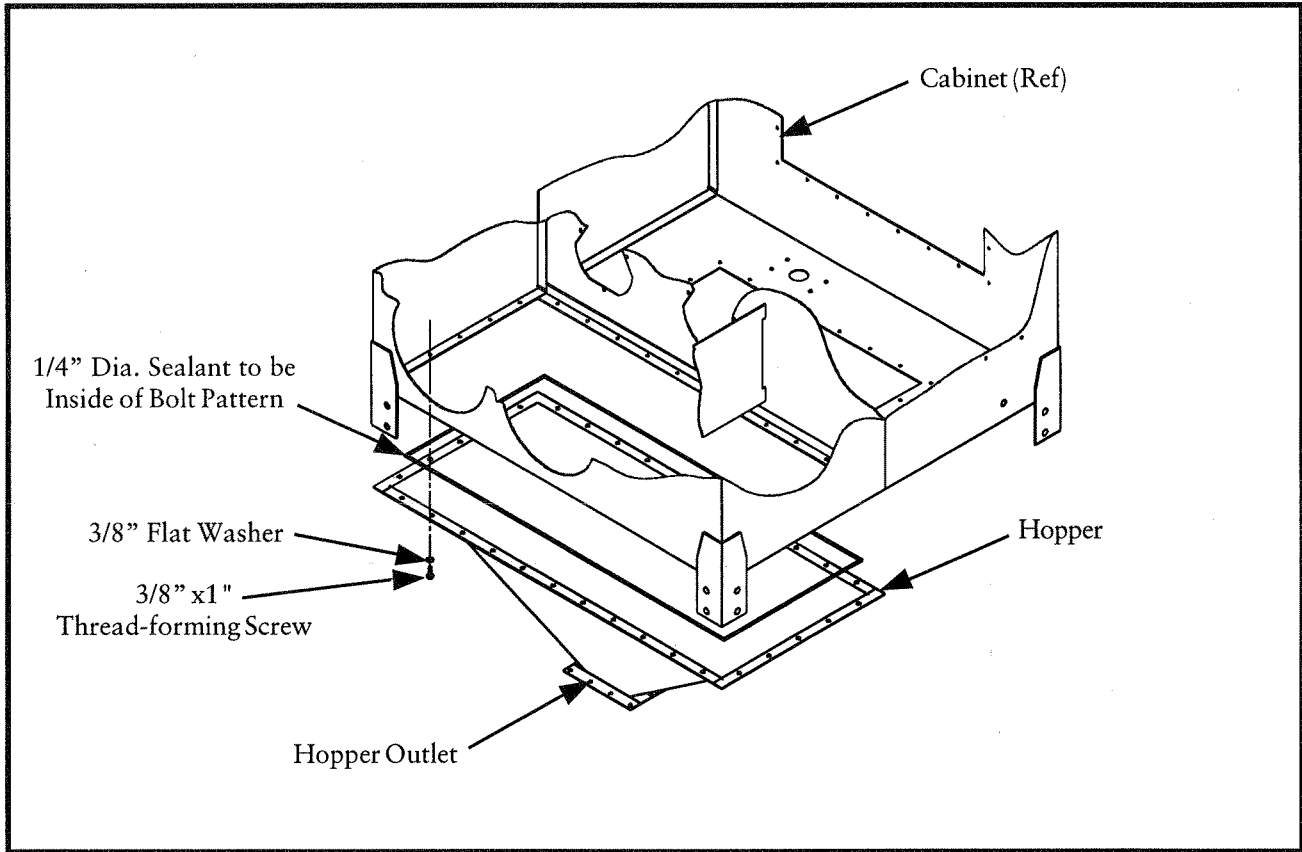


Figure 3
Hopper Installation

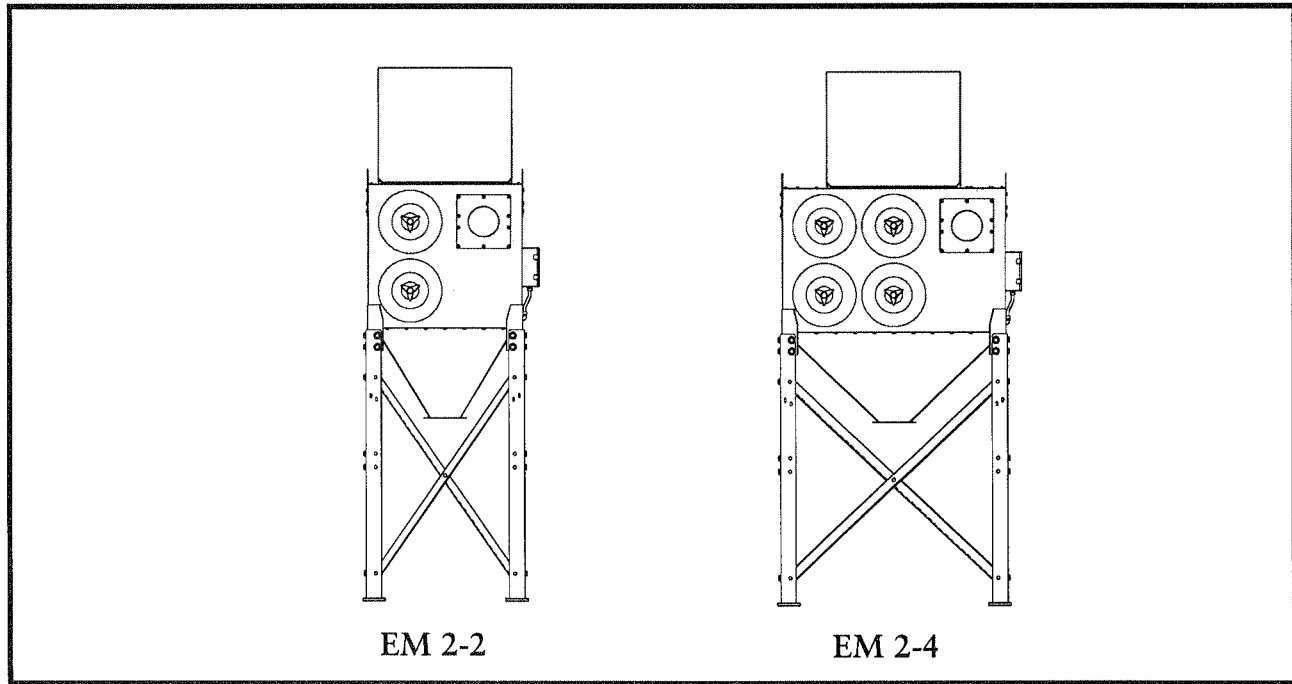


Figure 4
Leg Positioning and Crossbracing
Standard Leg Packs—Front View

2.5.2 Leg Installation (See Figures 4 and 5)

The position of the legs and crossbracing for each collector size are shown in Figure 4. Please refer to the Leg Assembly drawing which accompanied the leg set for proper location and assembly. All leg designs are rated for seismic zone 3.

1. Stand the leg set up and position as shown in Figures 4 and 5.
2. Lift the entire collector (cabinet and hopper) assembly into position over the leg set and lower into position carefully.
3. Use a set of drift pins to align the holes in the collector and legs, and attach the legs with the 3/4" - 10 x 1-3/4" long bolts, washers and nuts. **Do not tighten hardware at this time.**
4. Use a set of drift pins to align the holes in the cross braces to the rear side of the leg set. Attach the cross braces with 3/4" - 10 x 1-3/4" long bolts, washers and nuts. **Do not tighten hardware at this time.**
5. Recheck the position of the leg sets and crossbracing against Figures 4 and 5 and the assembly drawing.

6. Lift the assembled collector onto the foundation anchor bolts. Fasten each leg pad to the anchor bolts with flat washers, lock washers, and nuts (provided by customer). **Do not tighten hardware at this time.**
7. Level the collector while it is still being supported by the crane. Tighten all hardware on legs, crossbracing, and foundation anchors.
8. Before disconnecting the crane, recheck all of the hardware to make sure it is securely tightened. After checking hardware, disconnect the collector from the crane (refer back to Figure 1 for Typical Installation.)

CAUTION

Make certain all leg bolts are securely tightened.

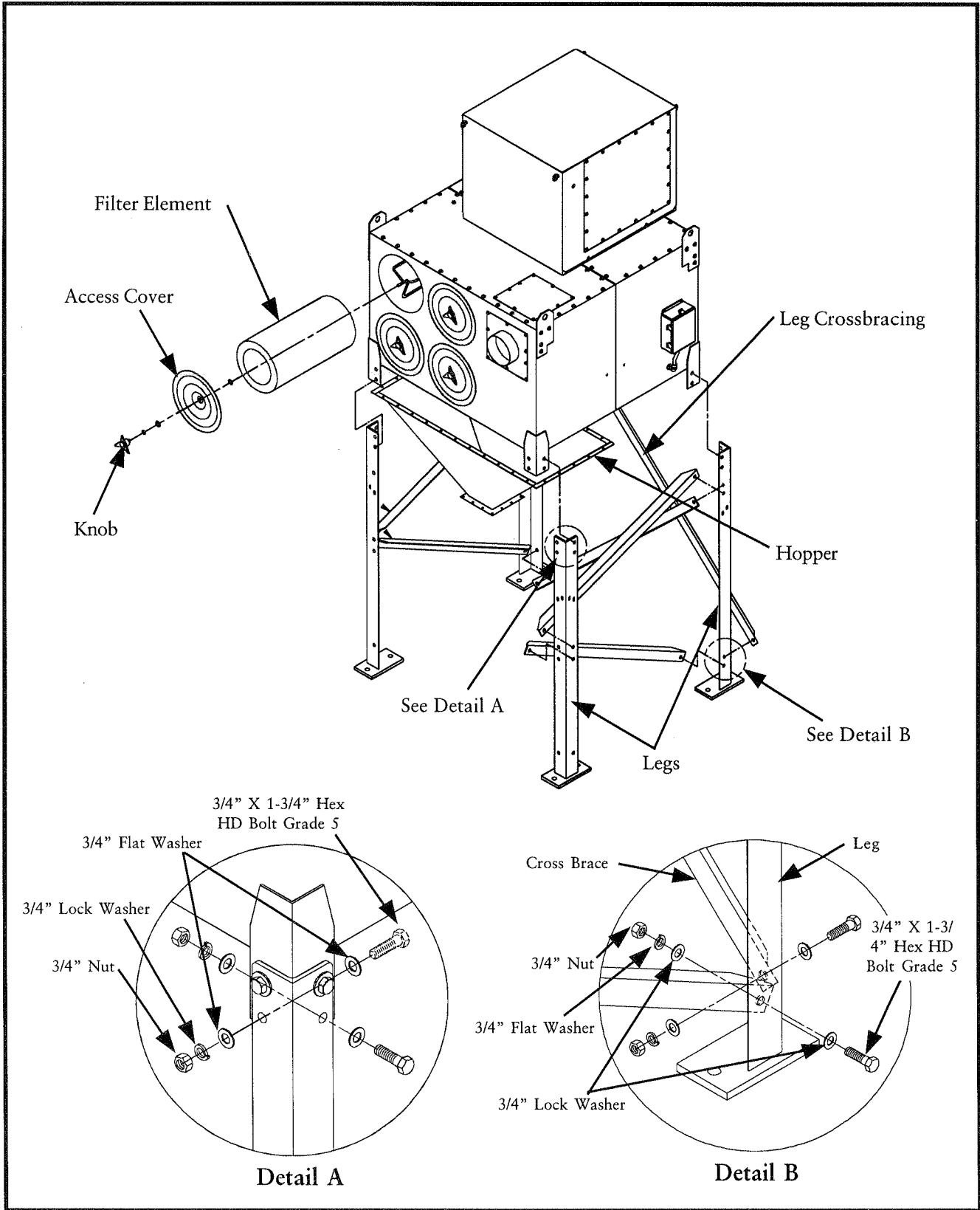


Figure 5
Parts Drawing/Leg Bolting Details

2.6 Assembly of Optional Equipment

2.6.1 55-Gallon Drum Cover Pack With Gate (See Figure 6)

The 55-gallon drum attachments are designed to fit a 55-gallon drum that measures approximately 24" diameter x 33" tall. The 55-gallon drums are not supplied by Empire. The flexible hose attachment allows for easy drum installation and removal. A pallet under the drum will allow heavier material to be removed by a lift truck.

1. Apply 1/4" diameter sealant between the hopper flange and the slide gate as shown in Figure 6.
2. Fasten the drum cover pack and slide gate to the hopper flange using 3/8" bolts, washers, and nuts as shown in Figure 6.
3. Attach drum cover to 55-gallon drum as shown in Figure 6. If latches are included, use them to hold the cover to drum as shown.

2.6.2 Photohelic Gage (See Figure 7 and 8)

The Photohelic gage is a standard feature on the collector. The pressure taps for this gage are factory installed.

1. After unpacking the Photohelic parts, choose a convenient accessible location on or near the timer unit for mounting the gage.
2. Remove the three #6 - 32 x 5/16" long screws and plastic enclosure on back of the Photohelic gage and set aside. Add the two jumper wires, two pressure switch wires, two power wires, and ground wire (supplied by customer) and wire the gage as shown in Figure 7, using 3/4" conduit opening. Reassemble plastic enclosure and fasten securely using the #6 - 32 x 5/16" long screws previously removed.

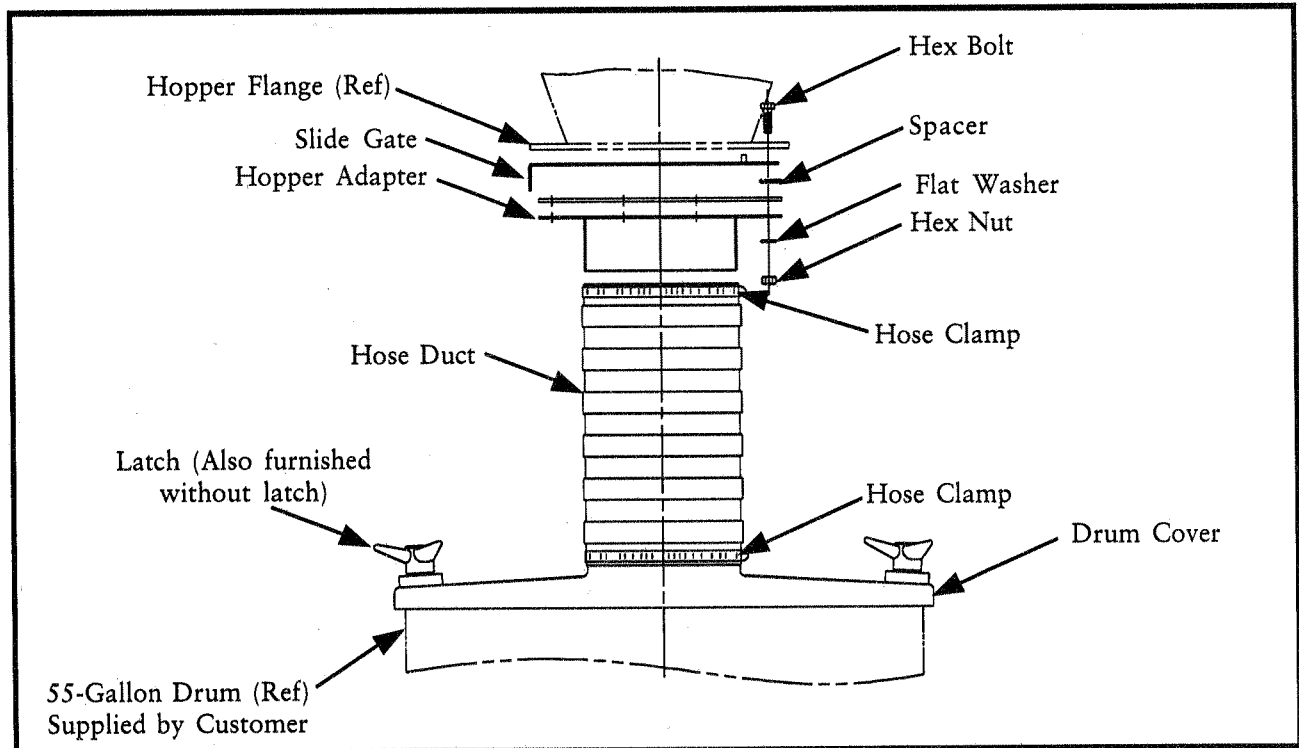


Figure 6
Hose Drum Cover Pack With Gate

3. Mount the gage to the bracket with mounting ring, retaining ring, and four #6 - 32 x 1-1/4" long screws. Before tightening the screws, assemble the two 1/8" NPT x 1/4" O.D. male tube adapters supplied with the gage into the openings on the side of the gage marked high or low pressure. Align gage so that the two 1/8" NPT male tube adapters and the 2.375" hole diameter in the mounting bracket are in line and then tighten the four #6 - 32 x 1-1/4" long screws.
4. Locate the Photohelic gage and mounting bracket assembly for the best visual advantage. The plastic tubing will determine the maximum distance away from the collector that the mounting bracket and gage can be located (35 ft. is supplied). Remember that the tubing will have to be cut and that one piece may be longer than the other. If more tubing is required, please contact your local Empire representative. Once the mounting bracket assembly position is determined, mount this assembly to the supporting structure using the four self-drilling screws.
5. Install two 1/8" NPT x 90° hose barb fittings in the brass fittings on the side wall of the collector.
6. Connect the tubing to the high pressure and low pressure port fittings located on the Photohelic gage. The high pressure port tubing is attached to the pressure fitting mounted in the dirty air chamber (filter section). The low pressure port is attached to the fitting in the clean air chamber (see Figure 8).
7. Zero and maintain Photohelic gage per operating and maintenance instructions provided by the manufacturer of the Photohelic gage.
8. If a Photohelic or similar device is used as an internal control of the solid state timer, the valves will pulse only when the differential pressure reaches the high set point and will continue the pulse sequence until the low pressure set point is reached.

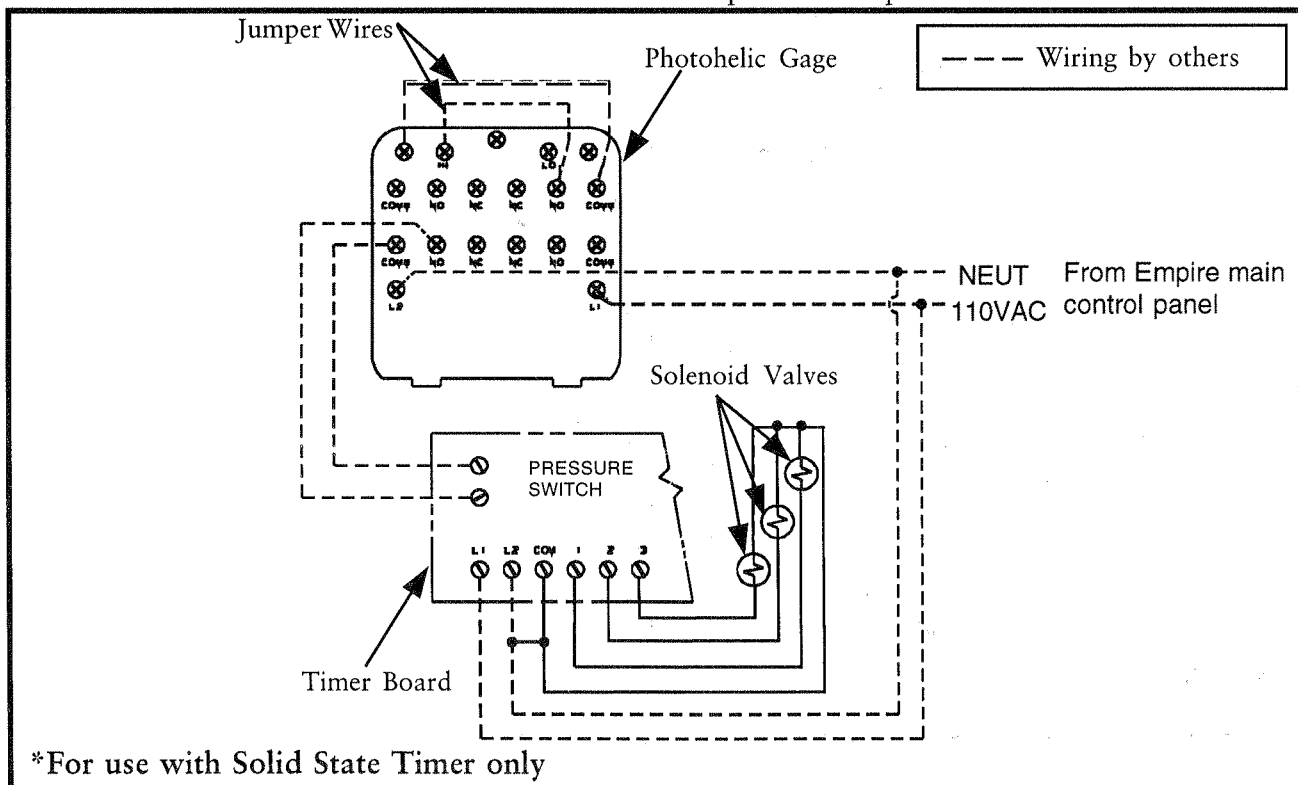


Figure 7
Photohelic Gage Wiring Diagram

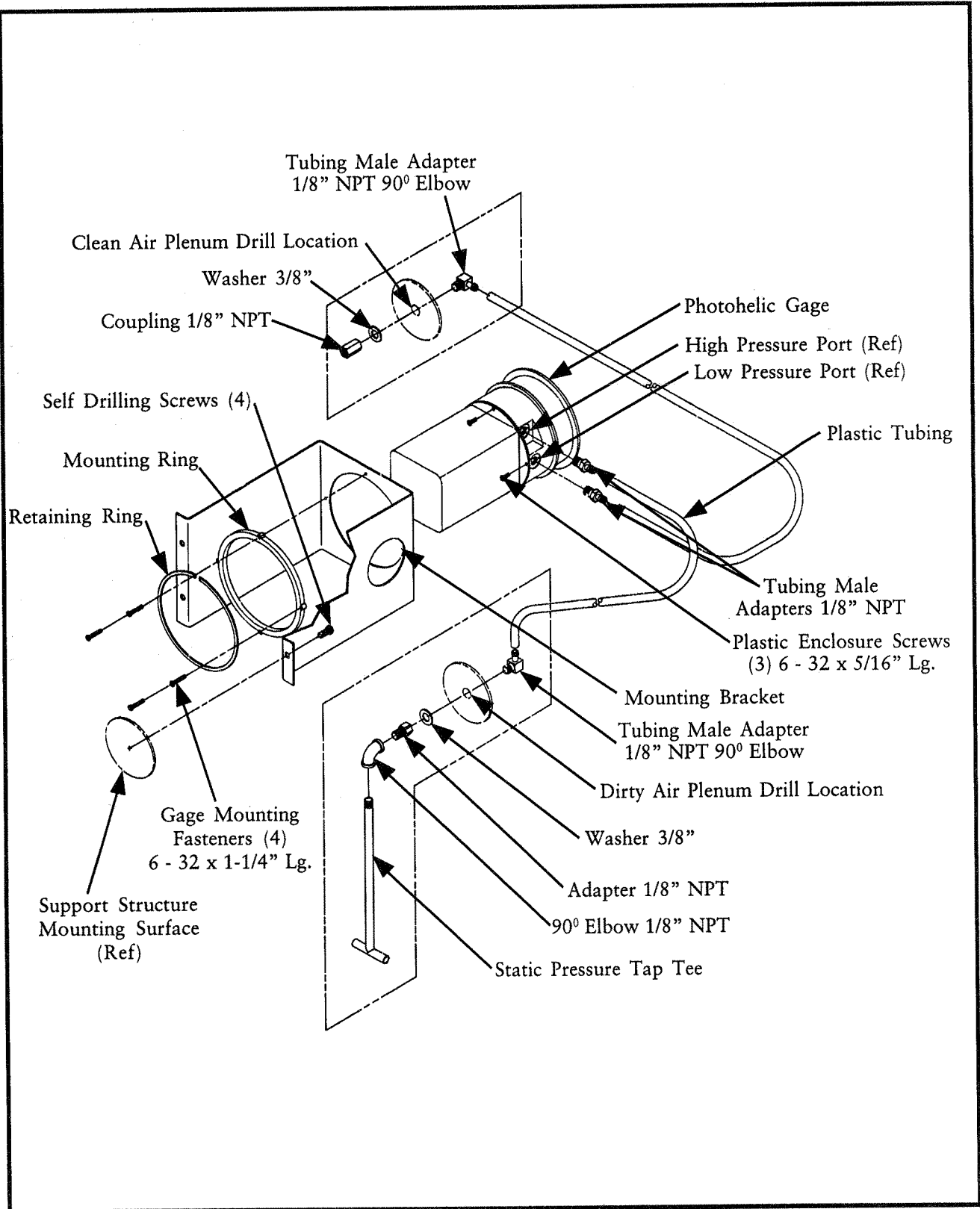


Figure 8
Installation of Photohelic Gage

2.6.3 Inlet Collar Installation (See Figure 9)

The inlet collar location and size is standard for the EM 2 dust collector. The inlet is installed on the collector before shipping and is covered with plywood.

1. If installation is required, apply the sealant onto the inlet collar plate mounting surface.
2. Position the inlet collar plate onto the collector inlet mounting surface by aligning the holes and fasten securely in place using the 5/16" - 18 x 1" long bolts that are supplied.

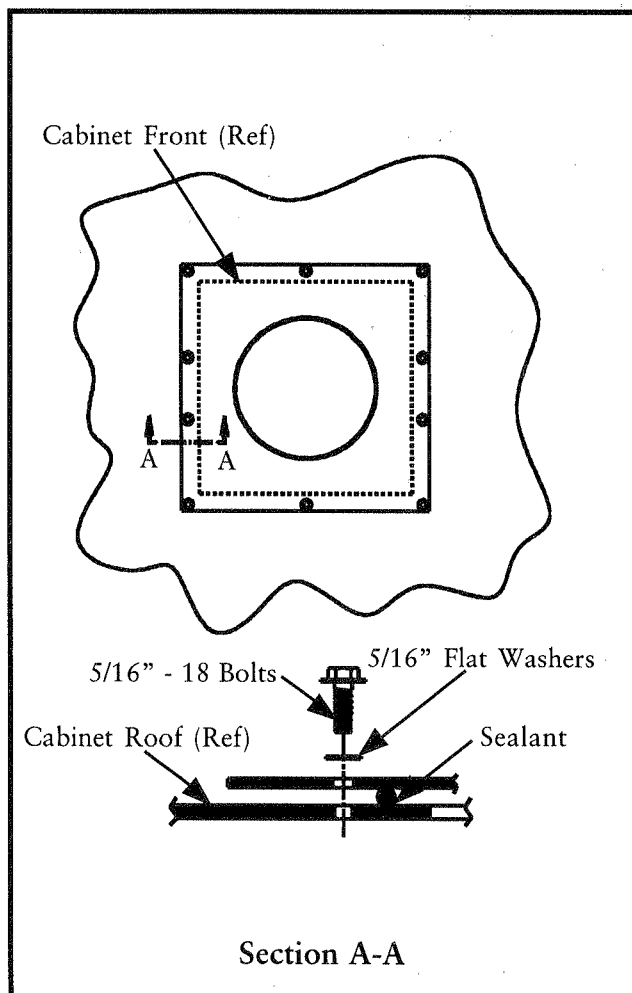


Figure 9
Installation of Inlet Collar

2.6.4 Blower Fan Mounting Instructions (5, 7-1/2, and 10 hp) (See Figure 10)

The 5, 7-1/2, or 10 hp power packs are designed to fit on the top of your dust collector. This is specified when placing the order.

NOTE

When installing your blower:

- Use proper equipment and safety guidelines when lifting and installing.
- Rotate the fan wheel before and after installing into the blower housing to assure proper clearance.
- Wiring of this motor to its source must be done by a qualified electrician.
- Rotation of the fan wheel is clockwise.
- If you experience difficulty when installing your blower, contact your Empire representative for assistance or call 1-800-493-4543.

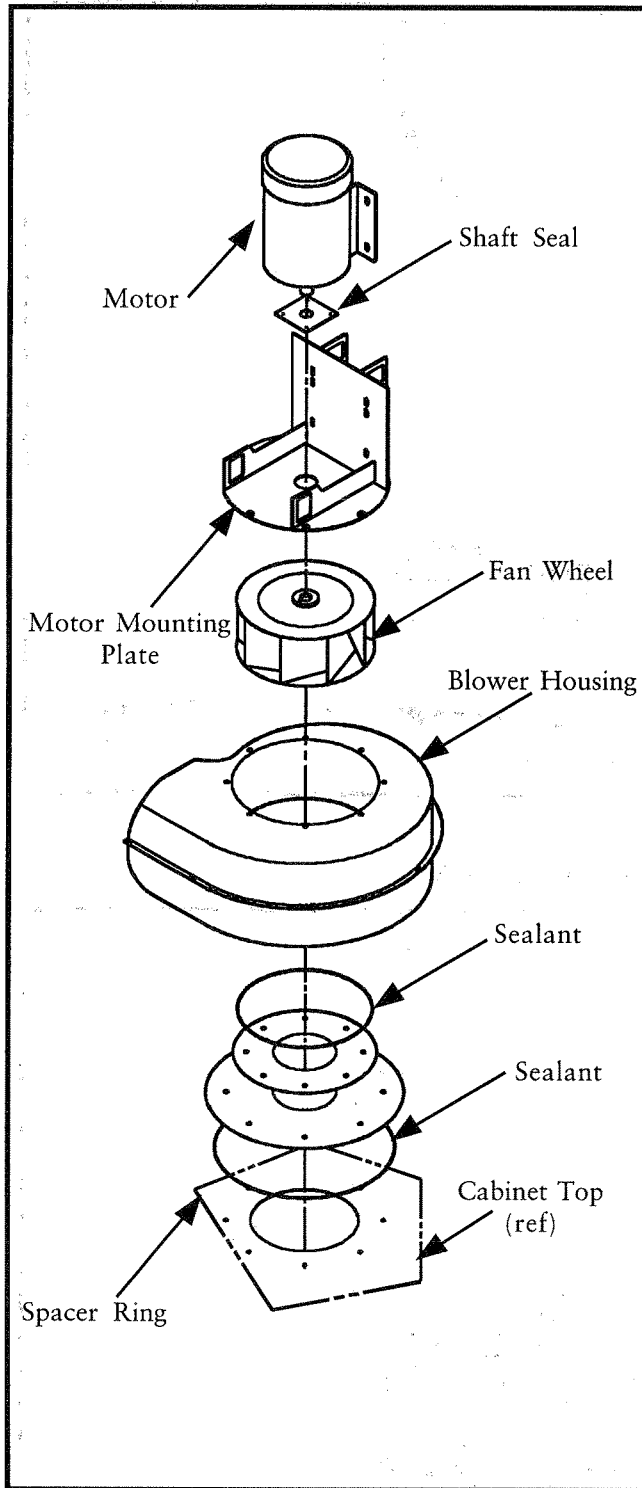


Figure 10
Blower Assembly

General Instructions:

1. Remove the motor fan assembly from the blower housing.
2. Make note of the location of all hardware for correct assembly.
3. Use sealant between the blower housing and the collector top on all models and also between the blower housing and motor mounting plate.

Torque: 5/16" - 18 bolts to 10 lbs./ft.
 3/8" - 16 bolts to 19 lbs./ft.
 1/2" - 13 bolts to 40 lbs./ft.

4. Mount the blower housing using bolts, flat washers, lockwashers, and nuts as shown in Figure 10.
5. Attach the motor fan assembly to the blower housing with bolts and lockwashers. Make sure to align the slot in the mounting plate with the tab on the housing.

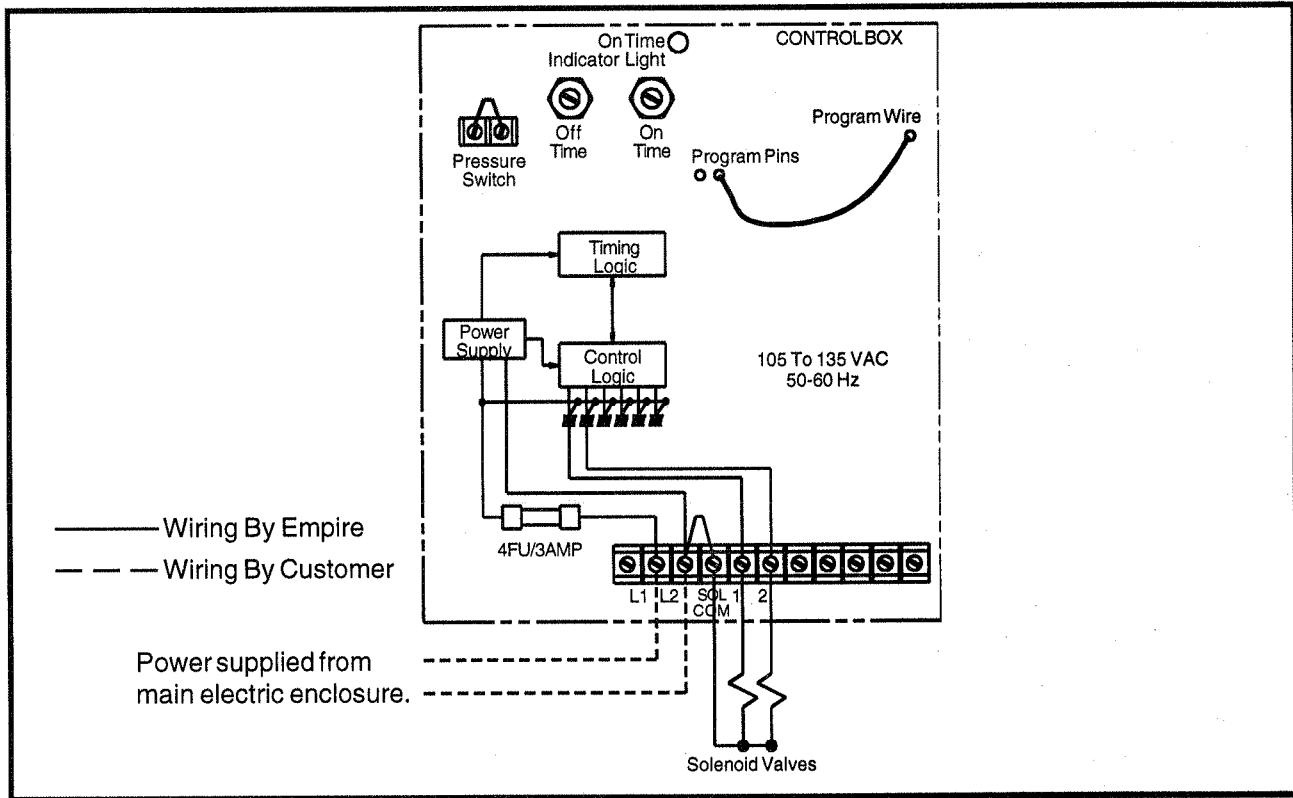


Figure 11
EM 2-2 Solid State Wiring Diagram

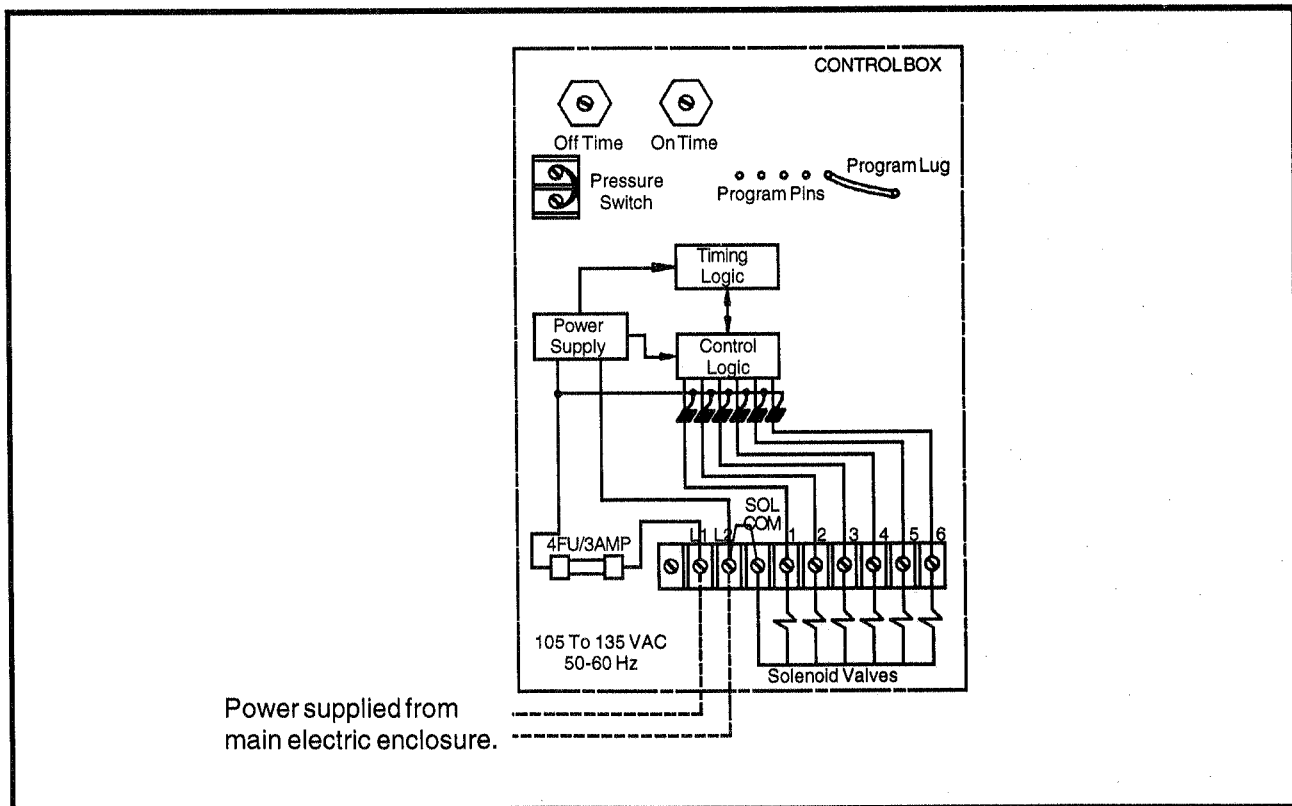


Figure 12
EM 2-4 Solid State Wiring Diagram

2.7 Electrical Installation (See Figures 11 & 12)

NOTE

All electrical work must be done by a qualified electrician according to local codes.

2.7.1 Blower Motor

If supplied, mount the lockout disconnect box near the blower motor at a location convenient for accessibility and maintenance.

Using the wiring diagram (supplied by Empire), make proper connections to fan motor, disconnect, and main electrical enclosure. All electrical apparatus should be properly sized for the required voltage.

Start fan motor and check for proper rotation. It should rotate clockwise when looking down at the top of the fan motor. Also reference the rotation sticker on the fan housing. Proper fan rotation is extremely important. Even if the fan is running in the wrong direction, it will deliver approximately 40% of its rated air volume. Lock out all electrical input power and interchange any two wire leads (3 phase only) at either the motor or optional lockout disconnect.

CAUTION

Disconnect all electrical power before servicing any electrical component.

2.7.2 Solid State Timer

The timer cycle is continuous unless a Photohelic pressure switch is installed and wired correctly (see Figures 7 & 8). When all of the available outputs are not required, programming the control timer for fewer outputs is accomplished by resetting the program pin selection wire on the solid state control timer to the correct number of solenoid valves being used (see Figures 11 and 12).

In grounded systems, neutral to control box must be connected to L2.

Input Operating Voltage: 105-135 VAC/50-60 Hz/1ph

Output Type: Solid state switch rated @ 200 watts maximum load per output.

Pulse Width (On Time): Factory set at 100 milliseconds (1/10 second).

NOTE

Do not adjust ON time unless the proper test equipment is used. Too much or too little ON time can cause shortened filter element life. Consult with your local Empire representative.

Off Time: Adjustable 1.5 to 30 seconds, factory set at 10 seconds.

Operating Temperature Range: -40° to +150°F.

Transient Voltage Protection: 30 Joule Varistor.

Solenoid Valves: 115 VAC at 19.7 watts each.

2.8 Installation—Compressed Air Supply (See Figure 1)

NOTE

- It is important that the compressed air supply be both oil and moisture free. Contamination in the compressed air used to clean filter elements will result in poor cleaning or cleaning valve failure and poor collector performance.
- Purge compressed air lines to remove debris before connecting to the dust collector compressed air manifold.

CAUTION

Shut off and bleed off compressed air supply before doing any service work.

Remove the plastic pipe plug from the end of the dust collector compressed air manifold and connect the compressed air supply line.

Use thread-sealing tape or pipe sealant on all compressed air connections. The compressed air shut-off valve, relieving-type regulator with gage, filter, and automatic condensate valve (supplied by customer) should be installed in the compressed air supply line. Locate these components for convenient service, start-up and shutdown of the dust collector.

Be sure that all compressed air components are adequately sized to meet the maximum system requirements of 1.1 scf per pulse at 90 psig supply pressure.

3.0 Pre Start-Up Check (See Figure 1)

CAUTION

Check to be sure that the blower fan exhaust is free of debris before starting.

4.0 Start-Up

1. Turn on the compressed air supply to the dust collector compressed air manifold. Adjust to 90 psig of pressure with the compressed air regulator. Pressure of 90 psig is the most typical setting for satisfactory cleaning performance (see Section 5.0 Routine Maintenance). The lower the compressed air setting, the less the pulse valve air consumption will be. Adjust the Photohelic low setpoint to 2 inches and the high setpoint to 4 inches.
2. On hoppers with drum arrangements, make sure all the connections are airtight (see Figure 6).

NOTE

Make sure the hopper discharge opening is sealed off (not open to atmosphere). Too much airflow to the blower fan will cause electrical failure.

3. Turn on the fan motor and check fan rotation by looking down from the top of the fan motor (it should be clockwise), or reference the rotation direction sticker on the fan housing.

CAUTION

Stand clear of fan exhaust area when blower is running, as debris can be exhausted and cause injury.

4. Adjust the control damper on the fan exhaust for desired system airflow.

NOTE

Too much airflow can cause electrical system failure and result in eventual fan motor failure.

5.0 Routine Maintenance

Compressed air is recommended to be set at 90-100 psig. The control timer is factory set to clean one set of elements every 10 seconds.

NOTE

- Do not increase compressed air pressure beyond 100 psig as component damage may result.
- Do not increase or decrease the pulse ON TIME on the solid state control timer. Longer or shorter pulse ON times do not aid in cleaning of filter elements, they just waste compressed air and cause shortened filter element life.

Pulse ON TIME can be checked or adjusted by consulting your local Empire representative. Empire does not recommend adjustment of this timer.

The preferred method of controlling cartridge pulse cleaning is with the pressure switch control (Photohelic gage). This controls the solid state control timer to only pulse at the desired high and low ΔP set points. The pulse cycle starts when the filter ΔP reaches the high set point and continues until the low ΔP set point is reached, at which time the pulse cycle stops. This method of using the Photohelic gage can save additional compressed air, especially when the dust collector is not collecting contaminants.

Airflow adjustments can be made by testing the duct system flow rate and adjusting the volume control damper to the desired system flow rate.

NOTE

Check the fan motor amperage draw against the motor manufacturer's nameplate amperage rating. Over amperage of manufacturer's recommended rating of motor will cause damage.

** ΔP = Pressure drop across filter elements in inches water gage.*

5.1 Operating Checks

Monitor exhaust. Exhaust should remain visually clean. If a leak develops, it will be first noticed as a visible puff of dust immediately after a cleaning pulse.

Monitor filter element pressure drop. Equilibrium pressure drop (stabilized ΔP) is generally 3-4 inches water gage on a Magnehelic or Photohelic for seasoned filters, but 1 to 6 inches water gage is considered normal.

NOTE

At initial start-up with any new filter elements, the fan motor may overload because of airflow higher than design level. If this happens, partially close a volume control damper and check blower fan motor amperage draw.

6.0 Service

CAUTION

- Disconnect electrical power before servicing any electrical components.
- Shut off and bleed compressed air supply before servicing any compressed air components.
- No welding should be performed inside unit without fire protection.

6.1 Filter Element Removal (See Figure 13)

1. When changing the filter elements, start at the top access ports of the unit first so that the dust that falls down into the hopper area does not have open access ports below.
2. Remove access cover by rotating the knob counterclockwise by hand. Set access covers aside.
3. Move the filters to break the gasket seal between the filter element and the element panel sealing surface. Rotate the element slowly 1/2 turn to dump any loose dust off the top of the filter element. Slide the filter element along the suspension yoke, and out of the front of the collector access port.
4. Check for an accumulation of dust in the storage area. If cleaning is required, see Section 6.3 Dust Removal.

NOTE

- Do not drop or rap the element on the floor or any other hard surface. Damage to the filter element will occur, resulting in leakage.
- It is necessary to clean the dust off of the element support panel all around the opening and off each filter end cap and the access cover to ensure a positive seal of the filter gasket.

6.2 Filter Element Installation (See Figure 13)

NOTE

- The filter element gasket end of all the filters must be inserted first, facing inward toward the clean air section or leakage will occur.
- Access cover knobs must be securely tightened. Lack of compression of the filter gaskets can cause leakage.

1. Slide the new Empire filter elements onto each suspension yoke.
2. Wipe off access cover gaskets and reinstall the access covers by rotating the knob clockwise onto the suspension yoke threads. Tighten securely by hand.
3. The dust collector is now ready to start up. Turn on electrical power, and turn on the compressed air supply before starting.

6.3 Dust Removal (55-Gallon Drum Only)

NOTE

Do not let the dust storage containers overflow. It can cause poor collector performance and create an extensive clean up due to overflow of dust when removing the container(s). In addition, it can cause dust to accumulate in the collector hopper, which should never happen.

1. Turn off the dust collector and empty as necessary. If the 55-gallon drum is used, empty the drum when 2/3 full.
2. If the hopper has a gate attachment, close the gate before servicing the drum. Remove and empty the drum. Reinstall the drum and open the gate. Ensure that the drum cover and drum make an airtight seal. The collector fan does not have to be shut off if this procedure is followed.

6.4 Original Equipment Filter Element (See Replacement Parts List)

The Empire filter element is the only replacement filter that will provide the high level of performance that you expect from your investment in the dust collector.

6.5 Compressed Air Components

CAUTION

- Compressed air can be dangerous.
- Before attempting service, shut off plant air supply to dust collector, and depressurize air manifold.
- Disconnect and lock out electric power to the dust collector fan.
- Do not operate dust collector with inspection or access doors removed.

1. Periodically check the compressed air components and service them by installing new compressed air filters and draining any moisture off by following manufacturer's instructions.
2. Check the dust collector compressed air manifold for contamination, oil and/or water. Clean or drain if necessary.
3. With the compressed air supply turned on, check the cleaning valves, solenoid valves, and tubing for any leakage. Replace any components that are leaking compressed air (reference the Replacement Parts List).

Some components listed above are located inside the collector and can be accessed by removing the bottom outlet covers.

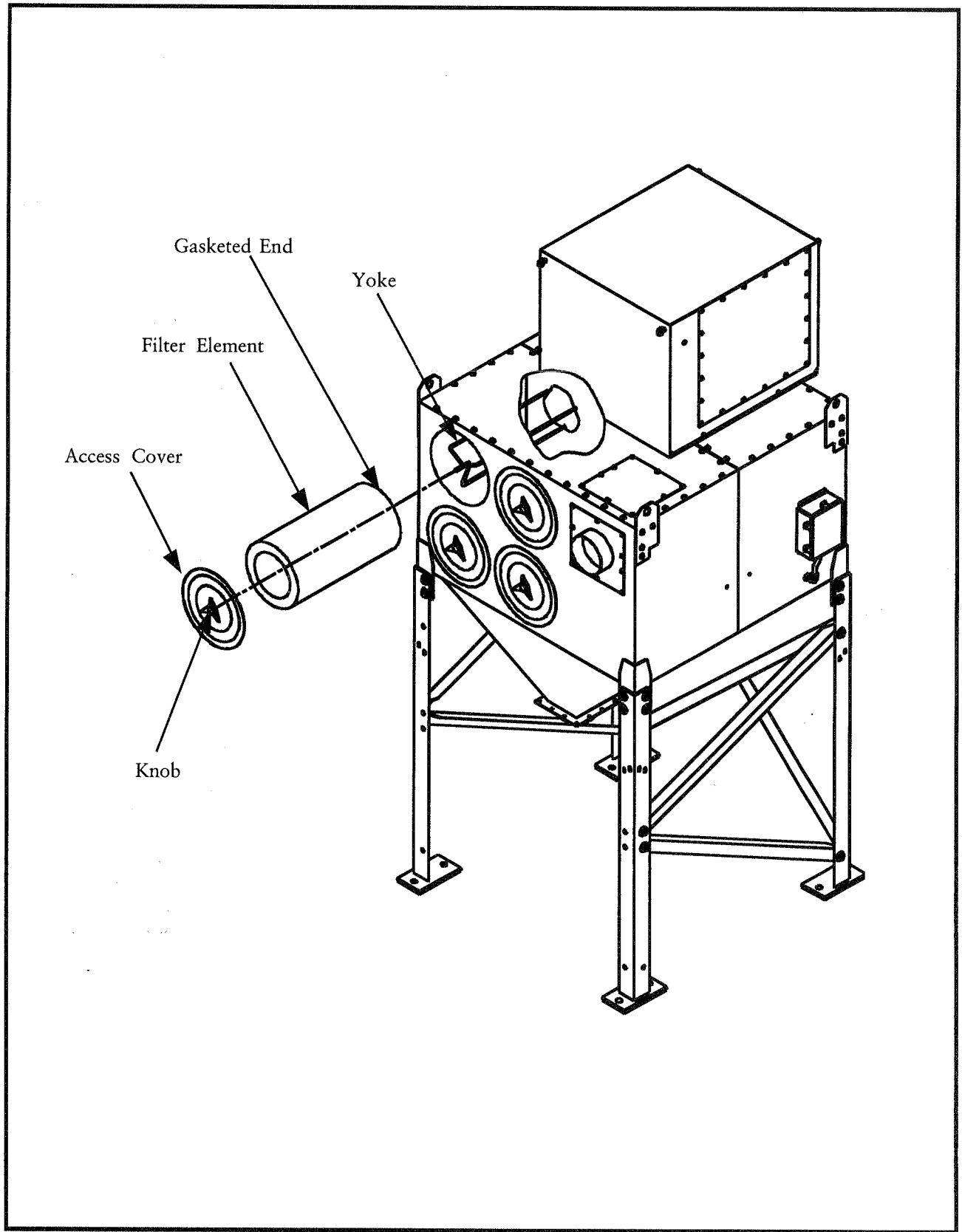


Figure 13
Filter Element Replacement

7.0 Troubleshooting Guide

TROUBLE	POSSIBLE CAUSE	REMEDY
<p>A. System will not start.</p>	<ol style="list-style-type: none"> 1. Power off. 2. Blown main power supply fuse(s). 3. Blown motor branch power supply fuse(s). 4. Blown control circuit fuse(s). 5. Tripped overload relay. 	<ol style="list-style-type: none"> 1. Close main electric disconnect. 2. Check/replace bad fuse(s). 3. Check/replace bad fuse(s). 4. Check/replace bad fuse(s). 5. Reset overload relay and check that the relay trip current for the overload is properly adjusted per the manufacturer's instructions.
<p>B. System will start, but fan motor will not start.</p>	<ol style="list-style-type: none"> 1. Optional fan motor disconnect open. 	<ol style="list-style-type: none"> 1. Close optional fan motor disconnect.
<p>C. System and fan motor will start, but system shuts down.</p>	<ol style="list-style-type: none"> 1. Tripped overload relay. 2. Fan moving too much air. 	<ol style="list-style-type: none"> 1. Reset overload relay and check per Section A5 above. 2a. Check for an airtight seal of the drum cover to the drum and at the filter access cover. If the drum is removed, the slide gate must be closed. 2b. Check dust hose from reclaimer to dust collector for holes and leaks. If leaks are found, repair or replace hose.

7.0 Troubleshooting Guide

TROUBLE	POSSIBLE CAUSE	REMEDY
D. Material discharge out of clean air outlet.	1. Filter elements installed improperly.	1. Check that gaskets on the filter element(s) are facing into the collector first. See Figure 13 and Section 6.2 Filter Element Installation located in this manual.
	2. Filter element damage, dents in the end caps, gasket damage or holes in pleated media.	2. Replace the filter elements. Use only Empire filter elements (see Figure 13 and reference Replacement Parts List). Install as in the Section 6.2 Filter Element Installation located in this manual.
	3. Access cover(s) are loose.	3. Tighten access cover knob(s) securely. See Figure 13 and Section 6.2 Filter Element Installation located in this manual.
E. Insufficient airflow.	1. Fan rotation backwards.	1. Check fan rotation. The fan rotation should be clockwise, looking down at the top of the blower fan motor. See Section 4.0 Start-Up located in this manual.
	2. Collector openings not tight or closed.	2. Make sure access covers are tightened securely. See Figure 13 and Section 6.2 Filter Element Installation located in this manual. Also check hopper outlet area and optional hopper attachments. See Figure 6 and Section 2.6 Start-Up.
	3. Fan exhaust area is restricted.	3. Check fan exhaust area for blockage. Remove material or debris that is blocking the fan exhaust area or adjust flow control damper on fan.

7.0 Troubleshooting Guide

TROUBLE	POSSIBLE CAUSE	REMEDY
<p>E. Insufficient airflow (cont).</p>	<p>4. Filter elements plugged with particulate.</p> <p style="padding-left: 20px;">a. Lack of compressed air.</p> <p style="padding-left: 20px;">b. Pulse cleaning not energized.</p> <p style="padding-left: 20px;">c. Dust storage area is too full or plugged.</p> <p style="padding-left: 20px;">d. Filter elements need to be replaced.</p>	<p>4a. Check compressed air supply for 90 psig minimum (see Figure 1). Increase pressure as described in Section 5.0 Routine Maintenance in this manual.</p> <p>4b. Check the Photohelic gage setpoints. Check supply voltage to the control timer with a volt ohm meter. Check the fuse on the control timer. If the fuse is blown, replace it with one of equal value. See Figures 11, 12, and Section 2.7 Electrical Installation.</p> <p>4c. Clean out dust storage area as described in the Section 6.3 Dust Removal in this manual and reference Figure 13, Section 6.1 Filter Element Removal, and Section 6.2 Filter Element Installation.</p> <p>4d. Remove and replace using only Empire filter elements (see Figure 13 in this manual and the Replacement Parts List.)</p>

7.0 Troubleshooting Guide

TROUBLE	POSSIBLE CAUSE	REMEDY
<p>E. Insufficient airflow (cont.).</p>	<p>5. Pulse valves are not functioning.</p> <p style="padding-left: 20px;">a. Pulse valves are leaking compressed air.</p> <p style="padding-left: 20px;">b. Pulse solid state control timer has failed.</p> <p style="padding-left: 20px;">c. Pulse control timer and Photohelic gage are out of adjustment.</p>	<p>5a. Lock out all electrical power to the dust collector and bleed off the compressed air supply. Check for debris, valve wear or diaphragm failure by removing the cover on back of the pulse valves. Also check for solenoid leakage and/or damage. If pulse valves or solenoid valves and solenoid tubing are damaged replace part(s) (refer to Replacement Parts List).</p> <p>5b. Check supply voltage to the control timer with a volt ohm meter. Check the fuse on the control timer. If the fuse is blown, replace it with one of equal value. If the fuse and input power to the control timer is okay, but there is not any output voltage to the solenoid pulse control valves, replace the pulse control timer (reference Replacement Parts List, Section 2.7 Electrical Installation and Figures 11 and 12).</p> <p>5c. Refer to the Section 2.7 Electrical Installation located in this manual and Figures 11 and 12 for timer adjustment and Figure 7 and 8 for Photohelic gage adjustment.</p>

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When ordering parts, give model number
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