

# **OPERATION, INSTALLATION, & MAINTENANCE MANUAL**

for

**Aircon compressed air (ECA)  
US Pat. No # 5,645,478  
and**

**Horizontal-bag removal filters**

**ECA 8-3**



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## **OPERATION OF AIRCON "ECA" HORIZONTAL BAG-REMOVAL FILTERS**

- A. Dust-laden air or gases enter the filter through the bottom of the unit.
- B. A blower housed vertically on side of the unit creates a negative pressure inside the unit. This causes air to be forced through the bags as it moves toward the side of the unit.
- C. As the air is filtered through the bags, the solid particulates in the airstream collect on the outer surface of the bags. When this airstream passes through this boundary, a pressure drop occurs. This drop in static pressure is proportional to the amount of dirt present on the outer surface of the bags. The use of a gage measuring the differential pressure between the plenum and the body section of the filter would assist maintenance personnel to set the desired sequence time and frequency of the pulsed cleaning air required for the filter to operate efficiently.
- D. Only a short duration blast of compressed air (50 to 500 milliseconds) is necessary to clean the bags of the lighter particulates. This blast "pops" or "snaps" the bags away from the cages by an increased pressure inside the bags. The instant this blast is exhausted, the movement of air through the bag collapses it against its cage. This snap action loosens dirt on the outer surface of the bag, and this dirt is then free to fall through the bottom of the filter.
- E. ECA filters are designed to aspirate dusts created from conveying solid material in and out of a horizontal conveyor. Although horizontal-bag removal filters with a side-mounted blower, inlet, and rectangular discharge hopper are not used for the same purpose as our other filters, both types of units require the same types of maintenance. Although this manual was designed primarily for ECA filters, the suggested procedures would apply to any type of bag-removal filter with an integral side-mounted blower.

## OPERATING INSTRUCTIONS

### RECEIVING

A quick inspection should be performed on the unit for damage that may have occurred in transit. Any missing or damaged parts should be noted with the shipper before accepting the shipment. Aircon is not responsible for any damage that occurs during shipping. **THE PURCHASER SHOULD BRING ALL DAMAGE CLAIMS AGAINST THE CARRIER.**

### INSPECTION

Upon accepting the shipment a closer inspection of the ECA unit is necessary. Care should be taken to thoroughly inspect each section of the filter for dents or cracks. Aircon should be notified of any inconsistencies between the unit and a certified drawing containing Aircon specifications. No changes should be made without the consent of Aircon.

### INSTALLATION

The following procedures are recommended to facilitate installation:

Erection: The unit will arrive fully assembled, with bags and cages already installed.

A sheet of galvanized steel bolted to the bottom flange of the unit in order to protect the bags during shipping may be removed. The bottom flange of unit may be unbolted from its mating flange and welded to the top of the horizontal conveyor upon which the ECA unit is to be located.

Bolting: Apply caulking to the bottom flange of the unit. Set, do not slide, the ECA unit onto this bottom flange, taking care not to loosen the caulking. The use of drift pins may be necessary for good alignment. Finger tighten these bolts. Only after all bolts have been set, should the bolts be properly tightened.

Bag and Cage Installation: Although the unit comes complete with bags and cages already installed, it may later become necessary to replace worn bags or cages. Bags and cages are accessible through the door on the side of the unit. Upon receiving any replacement bags, store them in an area free from moisture and harmful chemical vapors until the replacements can be made. Bags are to fit snugly against the cage with the excess bag length turned down at the top and clamped to the cage. Since a charge of static electricity collected on the bags presents a fire hazard, each bag contains a copper ground wire sewn in the bag.

Electrical: It is necessary to connect the sequence timer control box to a 115 VAC, 60 Hz. isolated circuit free of transient currents. This sequence timer control box may be remotely located from the filter (in a control station) or mounted on the side of the plenum on a specially designed bracket.

Differential Pressure Gage: Two (2) 1/8" NPT plugged couplings are available for the installation of a differential pressure gage. Connect this instrument so that the low-pressure side is attached to the fitting above the tube sheet (on the clean air side). In order to connect the 1/4" OD tubing to the ECA unit couplings and to the pressure gage, four (4) 1/4" OD to 1/8" NPT fittings are supplied.

Before Start-up: Purge the piping supply line first before connecting it to the diaphragm valve to ensure all contaminants are removed. Before pressurizing the diaphragm valve, check to see that the plastic tubing connecting the solenoid to the diaphragm valve is properly fit. Be careful that the diaphragm valve, valve fitting have been sufficiently tightened. If any parts require additional tightening, sealing compound should be re-applied. After wiring the sequence timing controller to the solenoid enclosure terminal strip, check both the "ON" firing time and the "OFF" delay time on the timing board. The recommended setting for the "ON" time is 200 milliseconds for all "OFF" times. The "OFF" time should at first be set to 180 seconds, and only the "OFF" time should be modified or reduced to enhance the performance of this unit. (See manufacturer's literature placed toward the end of this manual for more detailed operating instructions.)

Troubleshooting: Pressurize the diaphragm valve by supplying at least 2.0 SCFM @ 90 to 100 [psig] clean, dry, uncontaminated, compressed air. Observe one complete firing cycle. (For the correct number output to each solenoid, please consult the field-wiring diagram in this manual.) Note: a 1 1/4" sch 40 supply line will work as an air reservoir for an adequate pressure supply.

## **COMPRESSED AIR REQUIREMENTS**

The following compressed air requirements are essential for a maintenance-free cleaning operation:

- A. Pressure: 90 to 100 [psig]
- B. Quality: uncontaminated, clean, dry air that is free of water, oil, dirt, dust, rust, or scale

The importance of the above requirements for compressed air cannot be overly stressed. There are many methods and types of equipment to condition the air to meet these requirements.

To illustrate:

- A. Methods: types of compressors, receivers, after-coolers, dryers, and dirt legs where necessary
- B. Single line equipment
  - 1. In line filters
  - 2. Oil & water separators
  - 3. Centrifugal separators

## **FILTER UNIT START-UP CHECKLIST**

- A. Unit body sections and compressed air piping secured with all bolts adequately tightened.
- B. Unit bags and cages properly installed.
- C. Differential pressure gage or controller properly mounted.
- D. Sequence timer controller properly wired.
- E. Any unused optional or auxiliary NPT connections plugged and sealed airtight.
- F. Before turning on process equipment, allow the fan to blow air into or through the filter for at least ten (10) minutes. This will reduce the probability that dust will accumulate on cold surfaces within the filter due to condensation. At the conclusion of an operating period, turn off the filter fan and other related process equipment twenty (20) minutes before the compressed air supply and timer. This routine will allow the filter to be purged after each use.

## **TROUBLESHOOTING**

A. **OBSERVATION:** Visible dust leakage

1. Dust exhausted from plenum at constant rate, regardless of valve blasts

**PROBLEM:** Unsecured or missing bag (or bags)

2. Dust exhausted from plenum at variable rate

**PROBLEM:** Improperly installed bags

Holes in bags (from either damage or wear)

Dirty plenum (not cleaned after previous bag failures)

B. **OBSERVATION:** Loss of compressed air below blowpipe  
(pressure below 85 psig)

**PROBLEM:** Loose pipe fittings or plastic tubing

Dirt in diaphragm valve or solenoid plunger

Electrical problem with either compressed air supply or sequence  
timer box

C. **OBSERVATION:** Blowpipe blowing constantly

**PROBLEM:** Defective solenoid or diaphragm valve

Plastic tubing from diaphragm valve to solenoid valve leaking

D. **OBSERVATION:** Blowpipe not blowing

**PROBLEM:** Defective solenoid valve or coil

Defective diaphragm valve

Dirt or foreign material in solenoid or diaphragm valve



E. OBSERVATION: Differential pressure too high (5" to 7" wg)

PROBLEM: Insufficient supply of compressed air

PROBLEM: Poor filtering media (condensation on bags within unit; dust trapped inside bags; bags stopped up)

Timer control (shut-off interval too long; timer skipping valve; improper timing sequence)

F. OBSERVATION: Flow rate of air through system too low

PROBLEM:

High differential pressure resulting from bags not being properly cleaned (See above example.)

System blockage (blockage in conveyor leading up to filter)

## **ROUTINE MAINTENANCE**

### **INSPECTION**

#### Daily

Check differential pressure and re-adjust the "OFF" time on the sequence timer unit accordingly.

#### Weekly

Inspect timer and solenoid valve. Check to see if both the "ON" time and "OFF" time functions are working properly.

#### Monthly

Check amperage on fan motor to see if it's within normal limits.

#### Quarterly (every three months)

Remove several bags to observe their texture. Since a clean bag has a soft texture, a bag will have a hard texture to the degree to which it is not being cleaned.

Check to see if each bag is snapped in securely around tubesheet holes

Observe the dust accumulation in the plenum. This will alert maintenance personnel to any filtering problems.

## **SAFETY**

Before opening the access door on the top of the unit, please observe the following safety precautions:

- A. Turn off the filter fan and lock out all electrical disconnects for all associated and auxiliary equipment.
- B. Operate pulse-jet cleaning system for several cycles.
- C. For instances where toxic material is being removed by the filter, install a blank in the inlet duct. Open the plenum access door, and purge the filter with the pulse-jet system for at least twenty (20) minutes.
- D. Turn off electrical power to sequence timer, compressed air unit, and conveyor.
- E. Turn off compressed air.

## **STANDARD FEATURES OF ALL SIDE BAG-REMOVAL "ECA" FILTERS**

- A. 14 gage mild steel bolted construction to operate up to +/- 17" [wg]
- B. Removable internal compressed air hard pipe
- C. 3/4" NPT diaphragm valve
- D. Compressed-air cleaning regulated by manually adjustable sequence control timer housed in a NEMA 4 enclosure
- E. Differential pressure gage with 1/4" OD tubing connected to two (2) 1/8" NPT couplings (one each on opposite sides of the tubesheet) for differential pressure gage connections
- F. Unit painted Aircon gray with metal prepared with rust-inhibitive primer on both interior and exterior surfaces
- G. 5 7/8" diameter, 16 ounce singed polyester, top-removal, open-top bags.  
**Note: This Unit Has Non-Std. Woven Cuffs to prevent excessive wear.**
- H. 5 3/4" diameter top-removal, galvanized bag cages.
- N. Body-hinged, horizontal access door
- O. Fabricated grating in bottom of unit to avoid bag loss.
- P. Two sets of installation & maintenance manuals

## **OPTIONAL FEATURES OF BOTTOM BAG-REMOVAL "BV" FILTERS**

- A. NEMA 9 explosion-proof blower motor, solenoid valves, conduit, and sequence timer enclosures.
- B. Customer specified filtering media (Nomex for high-temperature applications, or an epitropic fabric with interwoven carbon fibers to suppress static electricity).
- C. Epoxy paint or regular paint per specified color
- D. Interactive pressure gage/sequence timer with "high" and "low" pressure controls for automatically regulating power to the timer
- E. Stainless steel bag cages or carbon steel cages w/ epoxy coating.

## ***ECA-6-1 FILTER UNIT***





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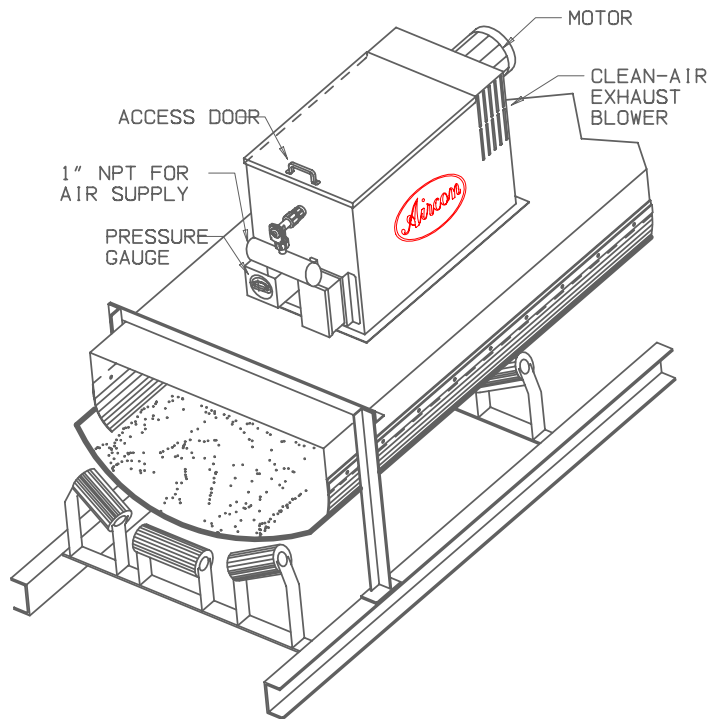
*ELF Conveyor Aspirator*

**ECA**

EFFECTIVE: March 3, 2009

United States Patent No. 5,645,478

*A New Application for Dust Control*



Aircon introduces a new line of units to our existing ELF series.

This easy to maintain automatic cleaning filter unit simply attaches to the top of the conveyor. The side-mounted fan produces 700 to 3600 cfm of aspiration to eliminate pressurization and dust control problems.

OPERATING REQUIREMENTS

- \* 115 VAC, 60 Hz. single phase current required for the following:
  - (a) adjustable pulse sequence timer
- \* 230/460 vac, 60hz, 3-phase current req'd. for blower motor

STANDARD FEATURES

- \* 14 gage mild steel bolted construction to operate up to +/- 17" [wg]
- \* Single 3/4" diaphragm valve
- \* Compressed air header for 1"NPT air supply
- \* NEMA 4 sequence timer enclosure
- \* Differential pressure gage with tubing connected to couplings in side of unit (above and below tube sheet)
- \* Standard exterior coating Aircon gray
- \* Fabricated grating in bottom of unit to facilitate bag removal and to prevent bags falling into conveyor.
- \* 16 oz. singed polyester, copper wire grounded, top-removal snap-in bags
- \* Top-removal galvanized bag cages
- \* Body hinged access door
- \* Two sets of installation & maintenance manuals

SOME ADVANTAGES of the **ELF** Conveyor Aspirator

- \* NO air permit required (if inside).
- \* Reduces the size of LARGE and COSTLY dust control and pneumatic conveying systems.
- \* Air remains inside the building, reducing or ELIMINATING make-up air requirements.
- \* NO concrete required.
- \* NO outside MAINTENANCE in harsh conditions.
- \* SMALL, and easy to maintain.
- \* GREATLY REDUCES initial overall air system costs.
- \* MINIMAL installation required.

OPTIONAL FEATURES

- \* NEMA 9 explosion-proof solenoid valves and enclosures  
Other types of filter media available.
- \* Explosion proof motor
- \* Epoxy paint or regular paint per specified color
- \* Thermocouple to monitor temperature of discharge air
- \* Pressure gage/ sequence timer automatic controller
- \* Stainless steel or epoxy-coated carbon steel bag cages

model #	number of bags	length of bags	filter media cloth area [sq ft]	compressed air produced [SCFM]	approx shipping wt. [lbs]	CFM capacity	Flange Size	HP
ECA 4-1	4	1'-0"	6.02	2.6	200	700	31" X 21"	2
ECA 6-1	6	1'-0"	9.03	2.6	250	1050	40" X 21"	2
ECA 8-1	8	1'-0"	12.04	2.6	300	1400	48" X 21"	2
ECA 9-1	9	1'-0"	13.55	3.8	350	1575	40" X 30"	2
ECA 12-1	12	1'-0"	18.06	3.8	400	2100	48" X 30"	3
ECA 16-1	16	1'-0"	24.08	5.1	450	2800	48" X 38"	5
ECA 20-1	20	1'-0"	30.10	5.1	500	3600	56" X 38"	7.5

NOTE: INFORMATION ON THIS PAGE FOR QUOTATION PURPOSES ONLY, NOT FOR CONSTRUCTION UNLESS CERTIFIED. DATA SUBJECT TO CHANGE WITHOUT NOTICE.