

OPERATION, INSTALLATION, & MAINTENANCE MANUAL

for

Aircon CAR Compressed Air Round

Top-Bag-Removal Baghouses

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**OPERATING PRINCIPLE FOR AIRCON "CAR"
COMPRESSED AIR ROUND FILTERS**

- A. Dust-laden air or gases enter at the inlet section of the filter.
- B. The deceleration of particles striking the inside surface of the cone section causes the heavier particulate matter to drop from the airstream into the cone discharge. Hence, the cone and inlet sections of this filter are comparable to a mechanical separator or cyclone.
- C. The swirl of air in the inlet and cone sections creates a low pressure area in the center area of the filter body. Consequently, the lighter (cleaner) air in the center of this vortex rises into the bags, which are contained in the upper and lower body sections of the filter.
- D. As the cleaner air is filtered through each bag, the particles remaining in the airstream collect on the outer surface of each bag. As the air passes through this surface, a pressure drop occurs. This pressure drop is proportional to the amount of dirt present on the outer surface of the bag. The use of a gage measuring the differential pressure between the plenum and the upper 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.
- E. 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 filter to the hopper discharge outlet.

OPERATING INSTRUCTIONS

RECEIVING

Since the filter may be shipped in several sections, a quick inspection should be performed on each section for damage that may have occurred in transit. Also, both the quantity and quality of any parts that may have been shipped loosely should be checked. Boxes containing these parts should be inspected for signs of improper handling that may have caused damage. 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 filter 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 (when applicable). No changes should be made without the consent of Aircon.

INSTALLATION

The following procedures are recommended to facilitate installation.

Erection

1. Assemble the support structure (per drawing if provided by Aircon).
2. Assemble the upper cone on the ground and upside down (larger part of cone down – note equal spaces between footpads).
3. Bolt the sub cone to the upper cone. Orient the sub-cone so clean out door and couplings are where desired. (Some models do not have a sub-cone.)
4. Turn the entire cone section right-side up and set in support structure.
5. Bolt the footpads of the cone to the support structure to secure the cone in place.
6. Assemble the four (4) sections (“cans”) of the filter separately on the ground using the panels provided (inlet body, venting body, variable body, and upper

- plenum). See assembly drawing for the number of panels required for each “can”. NOTE: Use caulking provided or other suitable caulking between each seam. This is necessary on all bolted seams.
7. Bolt the inner cone to the top flange of the inlet body “can” piece by piece using only a few bolts to hold each piece in place. Bolt the inner cone sections together as they are bolted to the inlet body flange. This step will determine the rotation (cw or ccw) of the filter unit. Place the inlet on the side desired for proper rotation, and install the inner cone on the top flange of the inlet body.
 8. Stitch weld the flange of the inner cone to the flange of the inlet body. Remove the bolts that held the inner cone in place. This is necessary because the inner cone flange will sandwich between the inlet body flange and the venting body flange.
 9. Bolt the plenum top to the upper plenum piece by piece. Bolt the top plate to the plenum top. Bolt the lifting lugs to the vertical seams of the upper plenum near the top of the upper plenum.
 10. Install the access platform (if provided) on to the plenum.
At this point the filter “cans” are ready to be stacked and lifted into place. The following method is preferred to avoid much work at high levels above the ground. However, the filter may be assembled according to the capacity of the available equipment. Refer to assembly drawing for weights, allowing a factor of safety for any additional loads attached to the filter.
 11. Set the upper plenum on the lower plenum and bolt together. Orient the outlet as required.
 12. Set the upper plenum/lower plenum on the variable body section and bolt together. Orient the access door as required.
 13. Set the upper plenum/lower plenum/variable body on the venting body section and bolt together. Be sure the chains on the vent panels of the venting body are on top, and the vent panels have adequate clearance for venting.
 14. Set the upper plenum/lower plenum/variable body/venting body on the inlet body section and bolt together. At this point, the inner cone should be assembled in the inlet body section with their flanges stitch welded together. Orient the inlet as required.
 15. Set the entire can section of the filter on the cone already mounted in the support structure and bolt together.
 16. Install ladder(s) if provided.
 17. Install the bags and cages as described elsewhere in this manual.

Bolting: Apply gasket sealant to each body ring. Set, do not slide, one section onto the other, taking care not to loosen the sealant caulking.

Use four (4) drift pins located at 90 degrees intervals, and install the bolts on either side of the pins. Finger tighten these bolts. Move these four drift pins around the circumference of the unit 45 degrees, and repeat the above operation. Repeat this same procedure by evenly dividing the angles remaining between the bolts. Remember these bolts require no more than finger tightening. Only after all bolts have been set, should the bolts be properly tightened?

Bag and Cage Installation: Lower the bags through the holes in the tubesheet. Form the snap top of the bag into a kidney shape in order to snap the bag into the tubesheet. Before lowering the cages into the bags, check to see if each bag snap top fits uniformly around its hole in the tubesheet. Keep bags from moisture and harmful chemical vapors.

Securing Walk-in Plenum Door: No tools are required to secure or to open the access door on the walk-in plenum. Since an excessively tight channel could warp a door, it is sufficient only to hand-tighten each door latch channel with the knob provided.

Auxiliary Equipment: Install any additional equipment required for the operation of the system such as an airlock, level indicator, or screw conveyor according to your system requirements. Two (2) ¾" NPT plugged couplings are available for the installation of an optional thermocouple and an explosion-proof light in the plenum. Either a 1 ½" or 2" NPT plugged coupling is available for the installation of an optional sprinkler system in the top of the plenum.

Electrical: The reverse air blower and rotating header motors should be wired 230/460 VAC, 3 phase, 60 Hz. through the 1 ¼" NPT coupling provided near the walk-in plenum door.

Differential Pressure Gauge: Two (2) 1/8" NPT plugged couplings are available for the installation of a differential pressure gauge. Connect this instrument so that the low-pressure side is attached to the fitting above the tube sheet (on the clean air side or top fitting).

Explosion Doors: If 3/8" metal bolts that were used to secure the explosion doors during shipping, replace these bolts with 3/8" - 16 x 1" PVC (dark gray plastic) bolts, which were shipped loose with the unit.

Before Start-up: Prior to starting the filter, bags and bag cages should be inspected to ensure that none of the bag cages are protruding into the path of the rotating manifold assembly.

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:

- 1. Methods: types of compressors, receivers, aftercoolers, dryers, and dirt legs where necessary
- 2. Single line equipment
 - a. In line filters
 - b. Oil & water separators
 - c. Centrifugal separators

FILTER UNIT START-UP CHECKLIST

- A. Unit body sections, supports, and compressed air piping secured with all bolts adequately tightened.
- B. PVC bolts installed in explosion doors after removing shipment bolts (if required).
- C. Unit bags and cages properly installed.
- D. Differential pressure gage or controller properly mounted.
- E. Sequence timer controller properly wired.
- F. Any unused optional or auxiliary NPT connections plugged and sealed airtight.
- G. Clean-out door secured.
- H. Plenum access doors in place and properly secured.
- I. Before turning on process equipment, allow fan to blow air into 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 system 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. Remember to discharge all related auxiliary equipment, i.e. the screw conveyor and rotary airlock.

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 (snap bands not adequately seated)

Holes in bags (from either damage or wear)

Dirty plenum (not cleaned after previous bag failures)

B. Observation: Loss of compressed air below header and blowpipes (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 timer

C. Observation: Any single blowpipe blowing constantly

Problem: Defective solenoid or diaphragm valve

Leak in plastic tubing between diaphragm valve and solenoid

D. Observation: Any single blowpipe not blowing

Problem: Defective solenoid valve coil or diaphragm valve

Dirt or foreign material in solenoid or diaphragm valve

E. **Observation:** Differential pressure too high (above 5" wg)

Problem: Insufficient supply of compressed air

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

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

F. **Observation:** Flow rate of air through system too low

Problem: System blower or fan (fan undersized; fan running backwards; fan belt slippage)

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

System blockage (blockage in duct 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 valves. Check to see if both the "ON" time and "OFF" time functions are working properly.

Monthly

Lubricate bearings on screw conveyor and fan, and check seals on airlock.

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 cage fits snugly over the edge of the snap ring of each bag.

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

SAFETY

Before removing plenum doors and entering plenum, please observe the following safety precautions:

- A. Turn off the system fan or blower 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. Remove plenum access doors (see note "G"), and purge the filter with the pulse-jet system for at least 20 minutes.
- D. Discharge any solid material from the unit through the auxiliary discharge equipment.
- E. Turn off electrical power to sequence timer, compressed air unit, and airlock.
- F. Turn off compressed air.
- G. Two operators are required to remove each plenum door. Plenum doors are to be removed completely.

STANDARD FEATURES OF ALL TOP BAG-REMOVAL "CAR" FILTERS

- A. 10 to 12 gage mild steel construction to operate up to +/- 17" [wg]
- B. Lifting lugs on clean air plenum
- C. Handrail surrounding plenum
- D. 4" to 6" schedule 40 pipe header for compressed air reservoir
- E. Removable internal compressed air hard piping
- F. $\frac{3}{4}$ ", 1", or 1 $\frac{1}{2}$ " NPT diaphragm valves
- G. Compressed-air cleaning regulated by manually adjustable sequence control timer housed in a NEMA 4 enclosure
- H. 1" to 1 $\frac{1}{2}$ " NPT coupling in plenum for optional sprinkler sized to accommodate one (1) $\frac{1}{2}$ " sprinkler per every 50 sq. ft. of plenum floor space
- I. $\frac{3}{4}$ " NPT coupling in plenum for optional thermocouple
- J. Differential pressure gage with $\frac{1}{4}$ " OD tubing connected to two (2) $\frac{1}{8}$ " NPT couplings (one each on opposite sides of the tubesheet) for differential pressure gage connections
- K. Unit painted Aircon gray with metal prepared with rust-inhibitive primer on both interior and exterior surfaces
- L. 5 $\frac{3}{4}$ " diameter, 12 ounce singed polyester, top-removal, snap-in bags with anti-static, copper ground wire
- M. 5 $\frac{5}{8}$ " diameter top-removal, galvanized bag cages
- N. Top-removal plenum access doors
- O. 60 degree cone hopper flanged to housing
- P. 1 $\frac{1}{4}$ " level indicator coupling in hopper

- Q. Hopper clean-out door
- R. Full welded exterior
- S. Two sets of installation & maintenance manuals

OPTIONAL FEATURES FOR TOP BAG-REMOVAL "CAR" FILTERS

- A. Outlet, inlet, and header orientation per job
- B. 24" to 36" square pressure relief ventilation panels to provide an approximate 40 to 1 (or any customer specified) [cu. ft. unit volume per sq. ft. vent] ventilation ratio
- C. Structural steel support
- D. NEMA 9 explosion-proof solenoid valves, conduit, and sequence timer enclosures
- E. Customer specified filtering media (such as a heavier 16 oz. singed polyester, or Nomex for high-temperature applications, or an epitropic fabric with interwoven carbon fibers to suppress static electricity)
- F. Epoxy paint or regular paint per specified color
- G. Thermocouple to monitor temperature of discharge air
- H. Sprinkler system installed in plenum
- I. Level indicator or poke hole in hopper
- J. Caged ladder to top of plenum
- K. Compressed air header service platform
- L. Interactive pressure gage/sequence timer with "high" and "low" pressure controls for automatically regulating power to the timer
- M. Carbon steel bag cages



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Compressed Air Round "CAR" FILTERS

EFFECTIVE:
November 1, 2002
 SUPERSEDES: January 1, 2001

OPERATING REQUIREMENTS

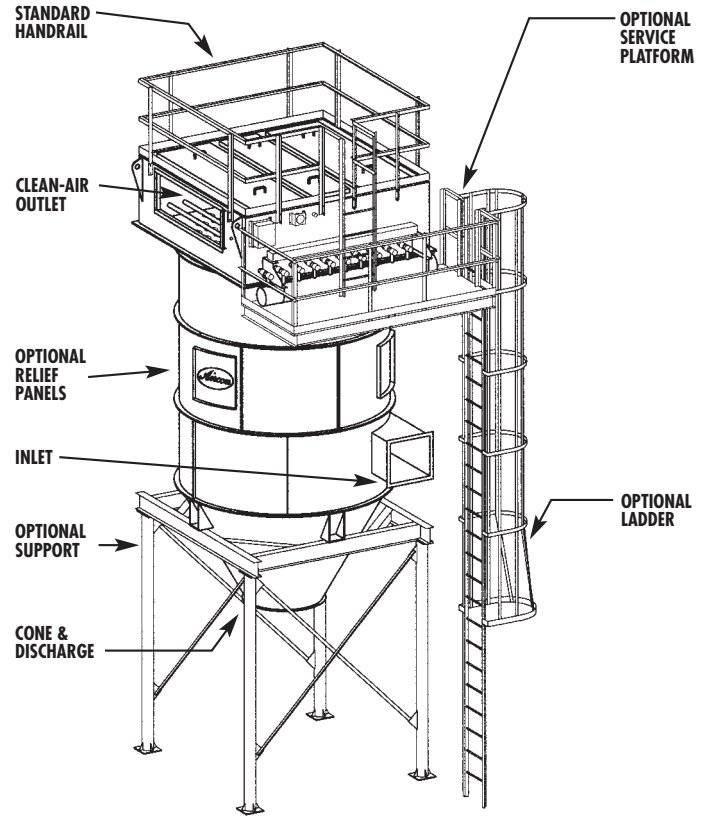
- 115 VAC, 60 Hz. single phase current required for sequence timer with adjustable on time (0.05 to 0.50 sec.) and off time (1.5 to 30 sec.)
- 90 to 100 PSIG clean, dry, uncontaminated compressed air supply required.

STANDARD FEATURES

- 10 or 12 gauge mild steel construction
- Tangential inlet (clockwise or counterclockwise) with internal particle-deflection cone and vortex breaker
- Lifting lugs on clean air plenum
- Handrail surrounding plenum
- 6" or 8" SCH 40 pipe header for compressed air reservoir
- Removable internal compressed air hard piping
- 1", 1 1/2", or 2" diaphragm valves
- NEMA 4 sequence timer enclosure
- Sprinkler coupling in plenum
- Differential pressure gauge mounted on plenum
- Unit painted Aircon gray with rust-inhibitive primer on both interior and exterior surfaces
- 16 oz. singed polyester, top-removal, snap-in bags with copper ground wire
- Top-removal galvanized bag cages
- Top-removal plenum access doors
- 60° pyramidal hopper flanged to housing
- Clean-out door and 1 1/4" level indicator coupling in hopper
- Two sets of installation & maintenance manuals

OPTIONAL FEATURES

- Inlet, outlet, and header orientation per job
- Pressure relief ventilation panels
- Structural steel support
- NEMA 9 explosion-proof solenoid valves, conduit and enclosures
- Other types of filter media
- Epoxy paint or regular paint per specified color
- Thermocouple to monitor temperature of discharge air
- Sprinkler system installed in plenum
- Level indicator and poke hole in hopper
- Caged ladder and header service platform
- Internal air diffusion plate in hopper
- Pressure gauge/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 REQUIRED (SCFM)	SHIPPING WT. (W/O OPTIONS) (LBS.)	FILTERING CAPACITY (cubic feet air/min.) AIR TO CLOTH RATIO		
						6:1	8:1	10:1
CAR 32-6	32	6'-0"	289	6.8	2670	1730	2310	2890
CAR 32-8	32	8'-0"	385	6.8	2890	2310	3080	3850
CAR 32-10	32	10'-0"	482	6.8	3110	2890	3850	4820
CAR 48-6	48	6'-0"	434	7.7	3430	2600	3470	4340
CAR 48-8	48	8'-0"	578	7.7	3710	3470	4620	5780
CAR 48-10	48	10'-0"	723	7.7	3990	4340	5780	7230
CAR 65-8	65	8'-0"	783	9.2	4630	4700	6260	7830
CAR 65-10	65	10'-0"	978	9.2	4970	5870	7830	9780
CAR 65-12	65	12'-0"	1174	9.2	5310	7040	9390	11700
CAR 80-8	80	8'-0"	963	16	5890	5780	7710	9630
CAR 80-10	80	10'-0"	1204	16	6290	7230	9630	12000
CAR 80-12	80	12'-0"	1445	16	6690	8670	11600	14500
CAR 101-8	101	8'-0"	1216	18	7070	7300	9730	12200
CAR 101-10	101	10'-0"	1520	18	7540	9120	12200	15200
CAR 101-12	101	12'-0"	1824	18	8010	10900	14600	18200
CAR 137-8	137	8'-0"	1650	21	8730	9900	13200	16500
CAR 137-10	137	10'-0"	2062	21	9290	12400	16500	20600
CAR 137-12	137	12'-0"	2472	21	9850	14800	19800	24700
CAR 164-8	164	8'-0"	1975	23	10100	11800	15800	19800
CAR 164-10	164	10'-0"	2469	23	10740	14800	19800	24700
CAR 164-12	164	12'-0"	2963	23	11380	17800	23700	29600
CAR 193-8	193	8'-0"	2324	26	11530	13900	18600	23200
CAR 193-10	193	10'-0"	2905	26	12240	17400	23200	29100
CAR 193-12	193	12'-0"	3486	26	12950	20900	27900	34900
CAR 276-8	276	8'-0"	3324	32	17480	19900	26600	33200
CAR 276-10	276	10'-0"	4155	32	18390	24900	33200	41500
CAR 276-12	276	12'-0"	4986	32	19300	29900	39900	49900

