



# Installation, Operations and Maintenance Guide

## AtmosAir FC100



# Visibly Cleaner Air

AtmosAir eliminates pollutants and restores air quality in commercial, industrial and residential buildings. When you choose AtmosAir, you'll refresh your indoor environment with the same clean, pure air found only at the highest mountain elevations.

## Product Overview

The AtmosAir FC100 ionization system is intended to be mounted in the supply discharge in smaller air handling systems such as fan coil, heat pump and other unitary type systems. The system can be integrated on an OEM basis or a retrofit package is also available. Access to the unit's control panel is provided. Power to the ionization unit can be interlocked with fan operation or controlled via an air pressure switch if required. The unit will be calibrated at the factory per AtmosAir recommendations to attain ion level readings of between 350 and 1,500 negative ions/cm<sup>3</sup>

AtmosAir equipment is effective in reducing odors and harmful pollutants through the introduction of positive and negative ions into the air stream to be treated. The number and size of the ionization tubes used is dependent upon the airflow, size of the space, and severity of the pollution and odors. The AtmosAir FC100 series equipment is designed for minimal maintenance efforts. The FC100 series has two components that require inspection and maintenance:

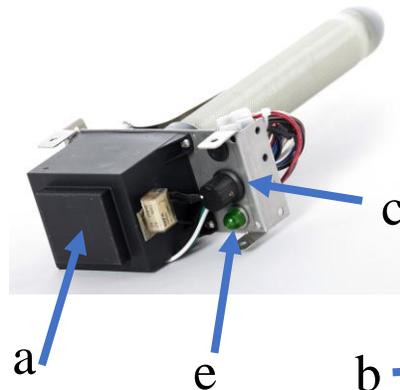
1. AtmosAir FC100 base unit components
2. Ionization tubes

Because there are no moving parts, little maintenance is required and the system has very low failure rates and minimal maintenance requirements.

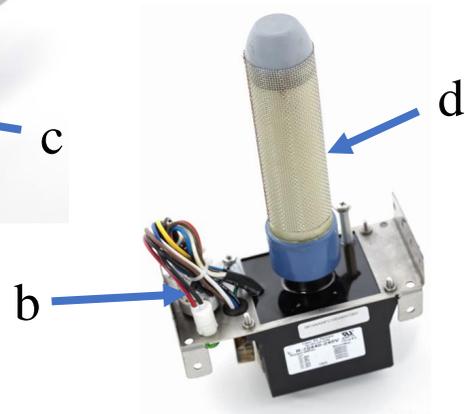
## Product Diagram

### *AtmosAir FC100 Series:*

- a. Power transformer—inside
- b. Power cord socket
- c. 5-step power adjustment switch
- d. Ionization tube
- e. System power light



### *AtmosAir FC100 series system equipment labeled.*



**Overall Dimensions: (Tube is exclusive)**  
L x W x H: 155.6mm x 73.7mm x 101.6mm

# Installation

AtmosAir FC100 series equipment can be mounted in a duct or air handler wall; or inside a plenum using a semi-custom mounting bracket. The units operate best when located after all filters, coils, and fans. Various mounting arrangements are possible; however, the available options may be limited due to size and configuration restrictions.

When mounted on the side of a duct or air handler wall, the enclosure should not be exposed to direct sunlight or moisture. If installing outside, a weatherproof enclosure with an access panel for servicing should be installed over the AtmosAir equipment.

The tube and electrode contacts should not come into contact with any conductive surface. A minimum 101.60mm clearance around the tube is recommended. All exposed metal parts are grounded.

## Mechanical Installation

Carefully remove the equipment from its shipping container. Inspect the main components, gasket, and tube(s) for damage. Verify that the unit's voltage rating is the same as the available voltage, 115/240 VAC.

**Install the ionization tube:** Gently pull the conductor strap back to allow the tube to turn freely; screw the end screw of the tube into the tube-holder hand-tight. Do not over-tighten the tube! Once the tube is secure, return the conductor strap to its normal position and ENSURE SOLID CONTACT IS MADE WITH THE TUBE'S OUTER MESH.

**Location and Orientation:** Install the unit downstream of filters, coils, and fans with tubes vertical whenever possible. If multiple units are installed in the same duct, stagger the units in the airflow so they are not in the same airflow path.

**For in-plenum/AHU installation:** Mounting varies with bracket-style. Typically, provide 101.60mm of clearance from walls. Units should be installed to allow easy access for maintenance. Install units so that the 5-step power adjustment knob and status light are easily accessible.

## Electrical Installation

AtmosAir FC100 series systems require approximately 5-20 watts depending on number and size of tubes.

Follow proper electrical procedures, guidelines, and codes for providing power to the systems, including requirements for conduit, sufficient ampacity, phase balancing, etc. Electrical installation should be performed by a qualified electrician.

Field-install a power plug outlet or junction box within 2.4m of the unit(s).

Each FC100 series unit is typically shipped with a 3m power cord with a C13 Computer Type

# Electrical Installation, continued

connector on one end and a Chinese CHI-10P Style 3 Prong plug on the other end. The plug can be cut off and wires stripped for junction box installations

## !!!WARNING!!!

The secondary voltage to the ionization tube can be as high as 3000 volts AC. Do NOT connect to power before the installation is complete and all personnel are aware of imminent operation.

Always disconnect power to the unit before handling any of the components.

## !!!WARNING!!!

## Operation

Once the system is properly installed and all personnel are clear of the high voltage tubes, the system can be turned on:

Ensure the ionization power knob is turned all the way counter-clockwise in the 'off' position.

1. Plug the power cord into the plug receptacle on the ionization system
2. Turn the system on and set the ionization power knob to the appropriate setting (1-5, with 1 being low and 5 being high). The green embedded LED light left of the power knob should light up to indicate that the system is on, ionization has been activated, and high voltage is being sent to the tubes. The system is intended to deliver ions into the treated area such that the ion levels should increase by 100 up to 1500 negative ions / cm<sup>3</sup>. The desired ion increase is dependent on many factors, including space, use, contaminant level, and distribution effectiveness. An authorized AtmosAir design consultant should recommend the desired ion increase and appropriate system layout.

!!!CAUTION!!! A non-functioning LED light may improperly indicate that the system is not functioning. Be sure to disconnect from the mains power before performing maintenance or troubleshooting the system.

## Maintenance Requirements

The maintenance requirements on an AtmosAir system are mainly site dependent; a dirtier environment requires more frequent maintenance. In general, quarterly or bi-annual maintenance is recommended along with a tube replacement every two years. The local AtmosAir dealer can provide you with an annual service contract.

# Maintenance Requirements, continued

## Quarterly/ Bi-annual Maintenance Requirements:

- Visually check the performance of the system by checking the green light on the individual units. If the light is on, and you can hear the 'buzz' of the tubes, then unit is functioning properly. If not, proceed to the troubleshooting section for repair. *Maintain a physical distance between all personnel and the tubes while system is operating or turned on.*
- **Optional:** Check performance using a high voltage probe (minimum of 5000 V) paired with a multimeter. Follow proper safety procedures for dealing with high voltages. *If you are uncertain, do NOT perform any maintenance with the power on and, instead, proceed to the next step.*

## ***Disconnect the system from the mains power before performing any maintenance steps.***

- Inspect the unit's enclosure, tube-holder, and the tube's plastic end cap. Remove any particle build-up. Thoroughly wipe clean any tracks or grooves that have developed in the enclosure or tubes.
- Inspect connections: tightness of the tube in the tube holder, the grounding clip, and its screw. Remove excessive rust on the tube connections using sand paper or a wire brush - it may be necessary to remove the tube for this step.
- Do not open the enclosure, or the warranty will be void.

It may be beneficial to clean the tubes to improve performance. The tubes can be cleaned using an air compressor for a quick clean, or more thoroughly with cleaning solutions. *Do not immerse the tubes in water. Ensure that the tube material and mesh are completely dry before re-installing.*

## **Tube Replacements Every Two Years:**

The ionization tubes should be replaced once every 24 months, at a minimum, as the production efficiency slowly declines over time due to the stress caused by plasma and (lack of) cleanliness of the electrodes. Old or excessively dirty tubes can also put undue stress on the transformer causing pre-mature failure.

# Troubleshooting

In the event that the system is not functioning, the first step is to check the power source and fuse:

- Check the fuse. If it is blown, replace it with the appropriately sized slow-blow fuse rated at 250 V and continue to the next step. The fuse is 5 x 20 mm in size.
- Check that the main power supply is sending the correct power to the unit.

# Troubleshooting, continued

- If the system is controlled by an air pressure switch, or the fan blower switch, check that these are not preventing power from being sent to the system.

If power is reaching the unit and it was necessary to replace the fuse, the next step is to determine whether there is a fault in the system or a tube. If all external sources of failure are eliminated, the system should be serviced by a qualified AtmosAir technician.

If the correct power is being supplied, the next step is to determine the cause of the failure, or blown fuse.

Typically, failures are caused by arcing between the inner and outer electrodes, or between one electrode and ground. This often occurs because of damaged tubes or dirty and/or wet conditions that have allowed carbon tracking to temporarily connect two electrodes and/or a grounding point electrically.

1. Inspect the enclosure and tube cap for tracking evidence.
2. Inspect each tube for cracks, pitting, or other degeneration of the dielectric material that causes the dielectric to fail and arcing to occur.
3. If physical inspection has not revealed the cause of failure, one may **carefully** observe the tubes as the ionization system is turned on to determine whether arcing is occurring at a particular tube. The fuse will usually blow, again, but for a short time, one may observe the cause of the power surge in the form of a visual or audio cue.
4. It may be necessary to remove the tube(s) to ensure that the transformer is working properly in the absence of tubes. If the fuse still blows, then the system should be serviced by a qualified AtmosAir technician.

It is recommended to also check the output (high) voltage levels of the system when a fuse has blown and been replaced, in order to ensure that the transformer has not been irreparably damaged. If the voltages are lower than expected, check that all the connections are secure and rust-free; also check the supply voltage again.

If the fuse continuously blows, or if the voltages are lower than expected, then the system should be serviced by a qualified AtmosAir technician.

Otherwise, replace the damaged tube(s), clean and smooth any mounting plate or end cap carbon tracking, and return the system to service.

~~**DO NOT** open the enclosure, as this will void any warranties. ~~

If the cause of failure cannot be determined, please contact AtmosAir for further help.

# Tube Cleaning Instructions

It may be beneficial to clean the tubes to improve performance, by removing dirt and grease from the tube and mesh where it impairs the ability to generate the plasma for ion creation. The tubes can be cleaned using an air compressor for a quick clean, or more thoroughly with cleaning solutions. Be sure to disconnect the system from mains power before performing any cleaning.

## Quick-Clean

Disconnect the system from the main power before performing any cleaning. Even if no person or object is in contact with the system, the air flow may inadvertently cause dirt, debris, water, or other objects to come into contact with an electrode or both electrodes and create a spark, if the system is operating. Use a light-duty air compressor for a quick clean of the tubes. Sweep the airflow over the tubes to remove the loose dirt and debris from the tubes. Clear the areas between and under the tubes with the air compressor. It may be useful to remove the tubes for improved cleaning. Cleaning the general area around the tubes to remove dust, dirt, and debris will keep the tubes clean longer.

### **CAUTION**

**Do not immerse the tubes in water. Ensure that the tube and mesh are completely dry before re-installing.**

## Thorough Clean

Disconnect the system from main power before performing any cleaning. Remove the tubes from the system.

A more thorough method for cleaning the tubes is to separate the outer mesh from the tube and use mild cleaning solutions.

1. Remove the mesh from the tube. Grasp the tube, not the end cap, while removing the mesh. Provide firm but gentle pressure when holding the tube. It may be necessary to gently twist the mesh in sections working from top to bottom until the entire length is loose enough to pull off.
2. Soak the mesh in a mild soap solution: 30ml of dish detergent per liter of water makes a great cleanser. Or use running warm tap water in a sink, gently rub the mesh to remove dirt.
3. If you allow the mesh to soak for a few minutes, rinse the mesh thoroughly with water to remove all traces of soap. Allow the mesh to dry completely.

# Thorough Clean, continued

4. Clean the tube with a mild soap solution, and a soft cloth or sponge. A non-scratch scrub sponge may help remove sticky material. Clean any carbon tracking residue off of the end cap. Rinse or wipe the tube and dry thoroughly. Be sure to avoid the seal between the cap and tube and between the cap and the end screw when rinsing.

5. Once the mesh and tube are completely dry, replace the mesh on the tube by sliding it gently over the tube. Be sure that the outer mesh is at least 1.25 cm from the end cap, and that both vertical seams on the inner and outer electrodes line up.

Once the tubes are clean and completely dry, reinstall the tubes in the system.

## Tips on Tube Life

Cleaning the tube is beneficial because it reduces stress on the transformer and also removes any dirt or oil that can inhibit the plasma from forming on the outside of the tube. Unfortunately, there are many other factors that affect the efficiency and life of the tube:

- The silicone seal between the tube and the cap keeps moisture from infiltrating the tube.
- Excessive aluminum oxide build-up on the inner electrode can decrease the strength of the plasma as the oxide essentially increases the thickness of the dielectric barrier.
- The plasma discharges between the mesh and the tube slowly wears on the tube, thinning the dielectric barrier. Eventually, repetitive stress from the discharges can create erosion holes.
- Carbon tracking or cracks in the end cap should be gently cleaned by hand; these allow an easy path for current to flow and creates a short in the system.
- Improper installation by tightening the tube itself on the 100 series too tight could cause the end cap to separate from the tube.

**AtmosAir Solutions™ mission is to bring and restore every indoor environment the same clean and pure quality air that is typically found at higher mountain elevations.**

**AtmosAir's unique and proven air purification process significantly reduces mold, controls the spread of bacteria and airborne viruses, and reduces airborne particles that evade normal filtration solutions. AtmosAir equipment uses non-thermal plasma technologies to generate bi-polar ionization that attacks and breaks down odors and contaminants.**