



Installation, Operations and Maintenance Guide

Matterhorn Series



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 Matterhorn series ionization generators are residential-sized units intended for installation in air conditioning systems or in custom-designed air distribution systems in small commercial spaces and typical residential houses. 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 Matterhorn series equipment is designed for minimal maintenance efforts. The Matterhorn series has two components that require inspection and maintenance:

1. AtmosAir Matterhorn base unit components
2. Ionization tubes

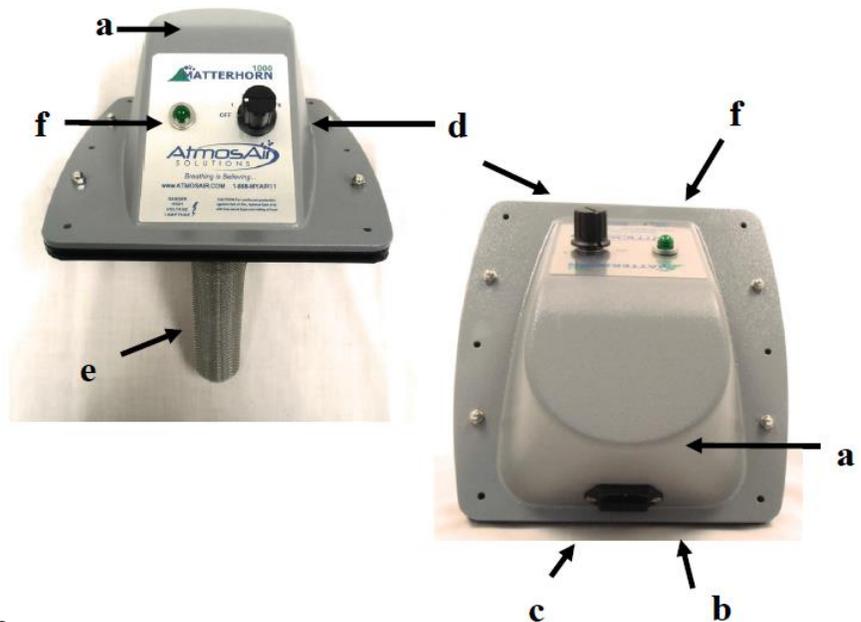
Because there are no moving parts, little maintenance is required and the systems have very low failure rates and minimal maintenance requirements.

Product Diagram

AtmosAir Matterhorn Series:

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

AtmosAir Matterhorn series system equipment labeled.



Overall Dimensions:

Height and width: 222.25mm x 215.90mm

Installation

AtmosAir Matterhorn series equipment can be mounted in a duct or air handler wall, using the faceplate mounting flange and its weather-strip gasket; 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 AtmosAir Matterhorn series operates on 220~250 VAC, 50/60 Hz. 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, 220~250 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-duct installation: Verify the flange gasket is in place and in good shape to ensure the unit seals properly. Make a cut-out in the duct sized at 139.70mm high x 152.40mm wide. A paper template is included for ease of installation; use the lines to cut the cut-out hole, then trace the cut-out and mark the locations of the mounting holes for the Matterhorn series.

Using the marked holes from the backer-plate template, affix the unit securely in the duct using self-tapping screws (if not using backer-plate). Do not over-tighten, this may strip the screw-hole. The unit is self-sealing to the duct so no further sealing is needed.

Mechanical Installation, continued

For in-plenum/AHU installation: Mounting varies with bracket-style. Follow mounting instructions provided with bracket. Typically, provide 101.60mm inches 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.

The backer-plate is intended for non-sheet metal duct installations where extra support of the unit is required. It may also be used for sheet-metal ducting. The backer-plate is meant to be installed on the inside of the duct, sandwiching the duct between the plate and the Matterhorn unit.

1. Mark the drill holes for the studs to mount the Matterhorn to the backer-plate. The backer plate captive nuts face forward.
2. Using an appropriate drill bit, 4.76mm, to drill the holes for mounting the backer-plate, then attach the backer-plate, inserting the studs into the holes, and using the tab, bend over tabs outward and flat to duct wall to retain backer plate to secure the plate to the duct.

Attach the Matterhorn series system using the six 6.35mm screws. The studs on the backer-plate will secure the Matterhorn series

Electrical Installation

AtmosAir Matterhorn series systems require approximately 6-20 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 electrical connection, 3-wire to junction box or country specific cord-set.

Each Matterhorn series unit is typically shipped with a 3m power cord with a C13 Computer Type 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 / cm³. 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.

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.*

Maintenance Requirements, continued

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 appropriate sized fuse rated at 220~250 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.
- 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.

Troubleshooting, continued

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 Installation Instructions

1. Ensure that all mains power is disconnected from the unit.
2. Carefully remove tubes from packing and check that the tube is free of damage such as cracking or a loose cap-to-dielectric connection.
3. Inspect the outer metal mesh and adjust, if possible, to maintain a 1.25cm distance from the end cap. It is ideal if the seams on both the inner and outer electrodes line up together.
4. Gently pull the conductor strap back far enough to allow the tube to turn freely.
5. Screw the end screw of the tube into the tube-holder hand-tight. Do not over-tighten the tube! **It is important to only hold the tube by the end cap when tightening;** otherwise the outer mesh may twist, reducing effectiveness, or worse, the seal between the dielectric material and the cap may break.
6. 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.



Once all tubes are installed and personnel clear, the power can be re-connected and the system turned on.

!!!CAUTION!!!

Use care in installation:

- Only tighten the tube into the tube-holder so the tube is not loose.
- Do not release the conductor strap abruptly, as the stress caused by the harsh contact with the dielectric material may cause stress leading to damage to the tube.
- Do not over-stress the conductor strap while installing the tube, causing deformation. The conductor strap should lay mostly flat against the tube to make solid contact.

!!!CAUTION!!!

Note: Nearly any size tube can fit the Matterhorn 800 series, including the C tube, the D tube, the E tube, and the F tube (not shown).



Tube Removal Instructions

3. Ensure that all mains power is disconnected from the unit.
4. Gently pull the conductor strap back far enough to allow the tube to turn freely.
5. Unscrew the tube from the tube-holder. **It is important to hold the tube only by the end cap, not the core or mesh, when first loosening the tube.**
6. Carefully remove the tube from the unit and release the conductor strap.



!!!CAUTION!!!

Be careful when removing tubes. The dielectric may be damaged; or wires from the mesh may have pulled away creating a potential puncture or scratch hazard.

!!!CAUTION!!!

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.

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.