Instructions for Installation and Operation of Fungi Perfecti’s
Air Circulation Systems I, IE, II & IIE

The air system package you have purchased was assembled and developed over a period of many years. The current configuration gives the mushroom cultivator the maximum number of options to tailor the air system to their growing environment. The Air Systems I and IE are suitable for rooms up to approximately 2000 cubic feet in volume, while the Air Systems II and IIE are suitable for growing environments 2000 up to 5000 cubic feet in volume (with additional enhancements, see page 3).

Please check that the package is complete before assembling. Enclosed in this package are the following items:

**Air Circulation System I**
1) A 360 CFM (@ .8" static pressure) plenum fan
2) A two-speed in-line “booster” duct fan
3) A sheet metal housing
4) A 99.97% efficient HEPA filter, 12 x 12 x 5.8 inches
5) 20 feet of 8 inch diameter vented ducting
6) 8 fine mist nozzles
7) A ¼" brass solenoid valve
8) An HC201 humidistat
9) A weatherized 4-outlet Ground Fault Circuit Interrupt (GFCI) extension box with 6 foot cord and two grounded 120V plugs

**Air Circulation System II**
1) A 360 CFM (@ .8" static pressure) plenum fan
2) A two-speed in-line “booster” duct fan
3) A sheet metal housing
4) A 99.97% efficient HEPA filter, 12 x 12 x 5.8 inches
5) 20 feet of 8 inch diameter vented ducting
6) A 1–3 gallon-per-hour (GPH) Mushroom Humidifan with Flow Meter and 12 feet of 1/4” water line
7) A ¼" brass solenoid valve
8) An HC201 humidistat
9) A weatherized 4-outlet Ground Fault Circuit Interrupt (GFCI) extension box with 6 foot cord and two grounded 120V plugs

(The Air Circulation Systems IE and IIE for 230V/50Hz applications also includes a 1000 VA stepdown transformer for use in the operation of those components that are not compatible with 230V/50Hz electrical current.)

**Installation (also see diagrams on pages 5 & 6)**

**Step I.** Cut an approximately 6 inch by 6 inch hole in the outer wall of your grow room. In a rectangular room, we recommend orienting the air system lengthwise to the shape of the room, at the center of one end of the room, as close to the ceiling as it will practically fit. Fungi Perfecti recommends that you construct a 1–2 cubic foot plenum box and secure it over the hole. A 4 x 5 inch hole will need to be cut in the bottom of the plenum box for the **plenum fan.**
Attach the fan over the opening, using the flange that runs around the mouth of the blower. This fan will bring fresh air from outside into your grow room. We strongly recommend that you construct a shelter over the fan to protect it from the elements, as it is not designed for all-weather use. If you enclose the fan within a box attached to the outer wall of your grow room, you can attach a furnace filter over the open end of the box to help screen out larger contaminants (see Figure 1). This will increase the life span of your HEPA filter. (Note: the plenum fan provided with the Air Circulation System IIE for 230V/50Hz applications can get very hot during normal operation. As a result, constructing a box large enough to leave approximately 1 foot of air space on all sides of the fan is recommended.) Once the other components of the system have been installed in it, the sheet metal housing will be mounted on the inside wall via the flange around the upstream end (see Figure 1), covering the opening, oriented so that the cut-outs are on the underside, facing the floor.

The first opening in the housing is called the “Recirc” door. When closed down, 100% fresh air is delivered from the hole in the wall, through the plenum fan. This condition is ideal at the time of primordia initiation. You should use the Recirc door to control the mixture of fresh and recirculated air, depending on your current stage in the mushroom growing process. This will vary according to species. For a complete list of growing parameters for various species, please consult Growing Gourmet and Medicinal Mushrooms and The Mushroom Cultivator.

The second opening is where the HC201 humidistat should be mounted with sheet metal screws (screws not provided). Be careful not to damage the mylar plastic band when installing. The humidistat senses the humidity of the recirculated air and activates a solenoid valve if there is insufficient humidity. The wiring of this humidistat is straightforward (see Figure 3), and a wiring diagram is printed on its face. Take off the cover and you will see 3 terminal screws: Orange, Brown and Red. For this application you want the humidistat to “CLOSES ON rH DROP”. This means that, as humidity falls below the level specified on the dial, the humidistat connects the Orange and Brown terminals, releasing the solenoid valve and allowing water to reach the fine mist nozzles. You can take a standard shop extension cord, cut off the receptacle and wire one lead directly to the solenoid/Humidifan. The other lead should be cut. The up-lead end is attached to the Orange terminal while the down-lead is attached to the Brown. The end of this second wire is attached to the other wire of the solenoid/Humidifan. Be sure to ground the humidistat. Use only copper conductors. Employ a licensed electrician should you have any doubt whatsoever in this procedure. In the Air System I/IE, once you have wired the humidistat to the solenoid valve, water will be delivered downstream to the 8 mist nozzles when humidity drops. In the Air System II/IIE, the humidistat is wired into both the solenoid valve and the Humidifan. As humidity drops, power is delivered to the solenoid valve to release water to the Humidifan, and power feeding the Humidifan results in the dispersal of atomized water droplets.

Step II Unscrew the four sheet metal screws where the sheet metal housing begins to narrow from 12 inches on a side to about 8 inches on a side. Insert the 12 x 12 inch HEPA filter into the opening so that the indicator arrow on the side of the filter is pointed downstream. Press fit the housing back together and replace the four sheet metal screws you removed earlier.

Step III Mount the circular booster fan into the end of the housing. Press it into place, making sure it is oriented in the proper direction, blowing downstream. Use the 4 pilot holes in the circular sleeve of the housing to drill 4 holes in the fan housing, then secure the fan in place using the screws provided with the fan. When connecting the fan's electrical terminals to your electrical current, use the connections marked Ground (green), Common (white) and High Speed (black), leaving the Low Speed wire unconnected. The booster fan pushes an additional 450–600 CFM through your system, and allows the recirculation duct to function properly.

Step IV Next, attach the vented polyethylene ducting to the booster fan. This ducting is pre-punched for quick setup, with 1 inch holes punched at 4 and 8 o’clock at intervals of approximately 12 inches. Tie off the end of the ducting at the point where it exceeds the length of your grow room. You can secure the open end of the ducting with duct tape. Suspend the ducting from the ceiling using wire loops (just about any wire will do), at intervals of approximately 4 feet. Please note that this system is designed to work with ducting lengths of approximately 15–30 feet. Exceeding the maximum recommended ducting length may exceed the ability of the booster fan to force air through the ducting and allow air to “back-channel” out of the recirculation duct. This will result in incorrect readings.
Step V—Air System I  Attach the **Solenoid Valve** to a water line made from ½ inch PVC pipe. Run the pipe as close to the underside of the polyethylene ducting as is practical. Install the fine mist nozzles at 2½ foot intervals along the water line. Connect the power line from the solenoid valve to the humidistat, to control the delivery of water to the nozzles. For your safety and convenience, we have included a weatherized multi-outlet extension with a built-in Ground Fault Circuit Interrupt (GFCI) system. In the event of an electrical short, the GFCI will cut power to the devices connected to it. Connect the multi-outlet box to a power source, then connect the humidistat and solenoid valve and humidifier to the multi-outlet box. (We also suggest connecting the plenum and duct fans to the multi-outlet box, as it will help to protect against electrical shorts.) We recommend installing a 5 micron sediment filter such as our **EWLF10** or **EWLF40** “upstream” from both the solenoid valve and the misting nozzles, to help protect your system from clogging.

Step V—Air System II  Mount the **Humidifan** as close to the sheet metal housing as is practical, mounted along the center line of the room and facing the back of the room. Connect your AC power line into the humidistat, and out from the humidistat into both the solenoid valve and the humidifan (consult the wiring diagrams on page 7), to control the delivery of atomized water droplets into the growing environment. The humidifan comes with 12 feet of water line, a connector to attach the line to a standard hose bib, and additional ¼” compression-style connectors to make connections between the water line and the solenoid valve and from the solenoid valve to the flow meter. (Depending on the layout of your system, you may also need to obtain additional water line in order to make all of your connections. Careful planning of the layout is suggested.) The flow meter allows you to control the rate of water flow to the humidifan, from a minimum of 1 gallon per hour to a maximum of 3 gallons per hour. We recommend installing a 5 micron sediment filter such as our **EWLF10** or **EWLF40** “upstream” from the humidifan, to help protect your system from clogging. In some growing environments, you may wish to install an additional fan behind the humidifan, blowing downstream, to help “boost” the unit’s dispersion distance.

**Additional instructions for enhancing the Air System II/IIE**

The Air System II relies on doorways and natural building flaws (cracks, etc.) for exhaust. This exhaust system can be enhanced through the addition of an exhaust fan or passive exhaust vent. We recommend our **10 inch Shuttered Exhaust Fan** (item code **EAFT10**), used in conjunction with a **Variable Motor Speed Control** (item code **EAFC12**). The exhaust fan should be mounted 7–8 feet above floor level, at the far downstream end of your grow room. The motor speed control is installed between the power source and the exhaust fan, allowing you to alter the rate at which air is exhausted from the room. Lower rates of exhaust allow for the conservation of heat and humidity, higher rates of exhaust increase oxygen levels and help lower temperatures through evaporative cooling. (Please note: the manufacturer of this device recommends that you do not set the speed control below 40% of the fan’s full capacity; doing so may cause excessive power drains and eventually damage the speed control.) It may be
necessary to install additional fine mist nozzles in addition to the exhaust fan in order to maintain humidity. When run continuously in conjunction with the rest of the fans in your air system, the exhaust fan facilitates the creation of an even, predictable pattern of air distribution within the grow room.

With the addition of an exhaust fan and motor speed control, the Air System II/IIE can reliably provide effective air distribution and humidity for grow rooms up to approximately 5000 cubic feet in volume. For grow rooms over 5000 cubic feet in volume, the Air System III, IV, IVE or V will be needed.

Additional Instructions for the Air Systems IE and IIE

Setup for the 230V/50Hz version of the Air Circulation System II is identical to that for the standard version, with one exception: the duct fan, humidistat, solenoid valve and humidifier must be wired into the included stepdown transformer before being wired into normal wall current. These devices are not capable of operating at 230V/50Hz, but can safely be operated so long as the stepdown transformer is installed between wall current and the devices. The total electrical capacity of this transformer is 500 volt-amps (the Air System IIE comes with a 1000 volt-amp stepdown transformer), which is more than enough capacity to handle these devices. However, do not exceed the capacity of this transformer by wiring additional electrical devices into it. The transformer is not weather- or waterproof, and must be installed in a waterproof housing or well away from excess moisture, sunlight, dust or wind. For your safety and convenience, we have included a weatherized multi-outlet extension with a built-in Ground Fault Circuit Interrupt (GFCI) system. In the event of an electrical short, the GFCI will cut power to the devices connected to it. Connect the multi-outlet box to the stepdown transformer, then connect the duct fan, humidistat, solenoid valve and humidifier to the multi-outlet box as shown in the diagram above. Employ a qualified local electrician if you have any doubt whatsoever concerning the safe operation of this device. All electrical devices must be installed to meet with local safety regulations.

Thank you for doing business with Fungi Perfecti! We wish you the best of luck in your future fungal endeavors. We highly recommend thoroughly familiarizing yourself with Growing Gourmet and Medicinal Mushrooms and The Mushroom Cultivator prior to undertaking any advanced cultivation operation, as they contain detailed information on all aspects of gourmet and medicinal mushroom cultivation. Should you have any questions concerning your system, please feel free to contact us.
Constructing a plenum box/shelter over the plenum fan is highly recommended. Providing an air space between the opening of the fan and the HEPA filter and orienting the fan at right angles to the filter reduces strain on the filter and increases its longevity. An inexpensive furnace filter installed “upstream” from the fan can provide additional filtration and add significantly to the life of the filter.

Suspend the plastic ducting from the ceiling with loops of wire or cord.

Attach the sheet metal housing to the wall of your room with screws.

The water line for the mist nozzles should be mounted as close to the underside of the ducting as possible. Nozzles should be placed every 2–2½ feet. To insure proper humidity control, make sure that the misting nozzles are installed at least 1 foot away from the humidistat.
Constructing a plenum box/shelter over the plenum fan is highly recommended. Providing an air space between the opening of the fan and the HEPA filter and orienting the fan at right angles to the filter reduces strain on the filter and increases its longevity. An inexpensive furnace filter installed “upstream” from the fan can provide additional filtration and add significantly to the life of the filter.

Suspend the plastic ducting from the ceiling with loops of wire or cord.

Attach the sheet metal housing to the wall of your room with screws.

The Humidifan should be mounted as high in the room as possible, just below the sheet metal housing.
Figure 3: Wiring Diagrams for the Duct Humidistat and Solenoid Valve

**ESHS Duct Humidistat**

1: Feed the power leads through a 3/4" clamp-type metal cable connector, then through the punch-out hole on the cover of the Humidistat, and finally through the nut for the cable connector.

2: Attach the black lead from the power supply cord or wire to the screw labeled “ORANGE”. Attach the black lead from the solenoid valve to the screw labeled “BROWN” and leave the “RED” screw unused.

3: Connect the white leads with a wire nut. Connect the bare copper or green lead from the power supply cord to the green lead attached to the Humidistat with a wire nut.

4: Insert the threads of the cable connector through the cover and tighten the nut. Replace the cover to the Humidistat.

5: Tighten the two cable connector screws down onto the power leads.

When wiring the Humidistat for use with the **Air System II or IIE**, you will require two power outlets coming out from the Humidistat: one to control the Solenoid Valve and one to control the Humidifan. Fungi Perfecti recommends connecting a multi-outlet cable or control to the electrical output of the Humidistat for use with the **Air System II and IIE**.

**EWSV Solenoid Valve**

1: Pair the wires from the Humidistat to each of the wires from the valve. Attach with wire nuts.

3: Fungi Perfecti strongly recommends protecting the electrical connections between the two devices by housing all such connections in water-resistant junction boxes and/or conduit.

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**DISCLAIMER**

These Wiring Diagrams are intended to be used only as a guide for those persons qualified to perform the work described. They are **in no way** a substitute for a certified professional electrician. Fungi Perfecti assumes no responsibility for fire, lost time, damaged equipment, personal injury, or any other result of improper wiring by persons undertaking installation procedures beyond their abilities.
Air and Humidity Flow in the Air System I/IE

FRESH AIR FROM OUTSIDE

RECIRCULATED AIR FROM INSIDE

FINE MIST FROM NOZZLES

Air and Humidity Flow in the Air System II/IIE

FRESH AIR FROM OUTSIDE

RECIRCULATED AIR FROM INSIDE

ATOMIZED WATER DROPLETS