Hospi-Gard® AirCeil™
HEPA Filtration System
INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

ENVIRCO Technical Support: 800-884-0002

ENVIRCO®
Innovators in clean air technology

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Introduction

Purpose
The Hospi-Gard® AirCeil™ module is a self-contained, ceiling-mounted HEPA filtration system specifically designed to provide a high velocity airflow pattern to filter out unwanted room particles including airborne microbiological contamination. The AirCeil can either recirculate clean air back into the room or exhaust the air out to create a cost effective, negative pressure, patient isolation room.

Description
Air enters the module through the intake grille located on the lower section of the unit. The air is evenly drawn by the motor/blowers first through a prefilter and then through a High Efficiency Particulate Air (HEPA) filter before being recirculated back into the room through the Ceiling Filtered Air Diffuser. Alternatively, the HEPA filtered air can be exhausted to the outside or returned to the main HVAC system to create negative pressure. Whether used for recirculation or exhaust, the Hospi-Gard AirCeil moves air at a variable volume ranging from 300 – 600 cubic feet per minute (ft^3/min) to carry away airborne particles generated by the patient or activities within the room.

Features
- The self-contained, ceiling mounted HEPA filtration system is designed to fit in a standard 2 ft x 4 ft T-bar ceiling grid or other ceiling types.
- Designed to effectively create a low-cost negative pressure isolation room to meet CDC and OSHA guidelines.
- Tamper resistant IR hand held remote controller allows for “hands off” controlling of the module.
- The optional Ceiling Filtered Air Diffuser and 12-inch Clear Flexible Ducting allows the unit to be converted from a 100% exhaust system to a total air recirculation system.
- Total height of the unit does not exceed 19.5 inches.
- Pending FDA and cUL listing.
- HEPA filter and prefilter are room-side replaceable.

Applications
Hospital
- Convert Patient Rooms To Negative Pressure Isolation Rooms
- Waiting Rooms
- Bronchoscopy Rooms
- Emergency Rooms
- Intensive Care Units
- Sputum Induction Booths And Rooms
- Aerosol Pentamidine Booths And Rooms
- Renal Dialysis Treatment Rooms
- Hospital Reconstruction Areas

Other
- Clinics
- Physician Offices
- Correctional Facilities
- Nursing Homes
- Homeless Shelters
- Addiction Recovery Center

CAUTION AND WARNINGS

CAUTION: To reduce the risk of fire, electrical shock, or injury to persons, observe the following.

1. **Installation work and electrical wiring must be done by a qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.**
2. **When cutting or drilling into a wall or ceiling, do not damage electrical wiring or other hidden utilities.**
3. **Service to and decontamination of this equipment should be performed by an authorized technician trained and experienced in performance evaluation and maintenance of clean air equipment. However, certain procedures are outlined in this manual that can be performed by the owner.**
4. **Before servicing the unit, switch power off at service panel and lock service panel to prevent power from being switched on accidentally, and follow proper procedures as necessary.**
5. **Use this unit only in the manner intended by the manufacturer.**

Installation

Unpacking Instructions

1. The Hospi-Gard AirCeil unit is shipped fully assembled in an open crate.
2. Inspect the AirCeil crating for any external shipping damage immediately upon arrival. If any damage is observed, a freight claim report should be completed and promptly filed with the responsible carrier.
3. Carefully remove the open crating from around the AirCeil unit.
4. Remove the plastic wrapping from the AirCeil unit and inspect for any undisclosed damage that may have occurred during transportation (Figure 1).
5. If any damage is discovered, file a claim with the responsible carrier immediately.

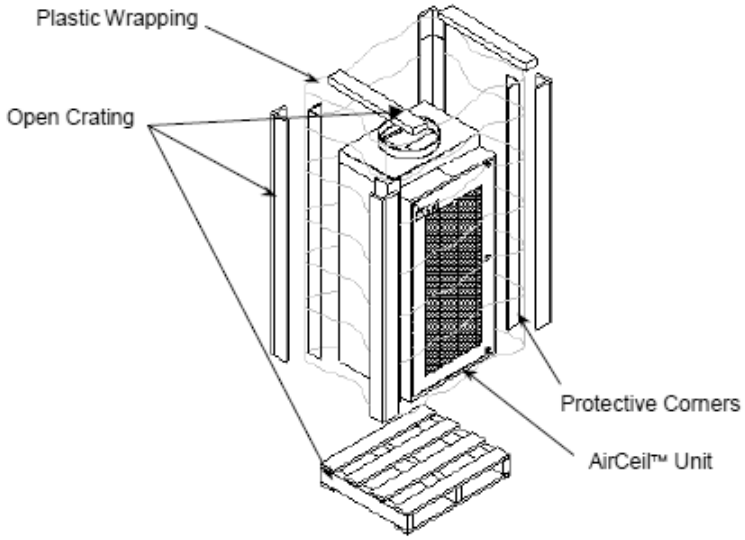

Figure 1: AirCeil™ Packing Components

Assembly

Note: The Hospi-Gard AirCeil unit is completely assembled at the factory with the exception of the ¼-inch-20 eyebolts that can be used when hanging the unit from an overhead structure.

- Insert four (4) ¼-inch-20 eyebolts (not included) into the nutserts located on the top-side of the AirCeil unit before lifting into an overhead position (Figure 2, page 5).
- Raise the unit and secure it into place using “S” hooks and chain to suspend it from an overhead structure (supplied by others).
- The AirCeil unit may be used to exhaust all of its air directly to the outside or to the main HVAC system by attaching 12 inch exhaust ducting to the duct collar, located on the side of the AirCeil unit.
  Note: Verify that the ducting and the external exhaust motor/blower can handle the air volume exhausted by the unit.
- The optional Ceiling Filtered Air Diffuser (Part No. 63841) and 12-in. clear flexible ducting (Part No. 63842) will convert the AirCeil unit for use as a 100% Air Recirculation Unit.
- If purchased with the optional power cord, plug the cord into a properly grounded three-pronged receptacle, otherwise hard wire according to the wiring diagram (Figure 8).
- Confirm the circuit to be used is sized to provide a minimum of 5 Amps and conforms to NEC (National Electrician Code).

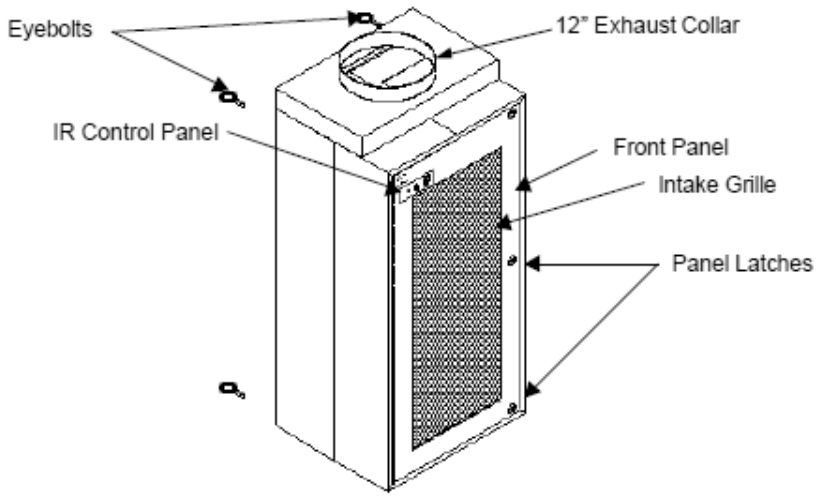

Figure 2: AirCeil™ Eyebolt Installation

■ Operation

Airflow Indicator Light
The Airflow Indicator light on the AirCeil control panel (Figure 3 below) glows red when the unit is running and green when in the standby mode or when adjusting the speed with the hand held IR Remote Controller.

Note: When the AirCeil is "OFF" both the red and green indicator lights are not lit.

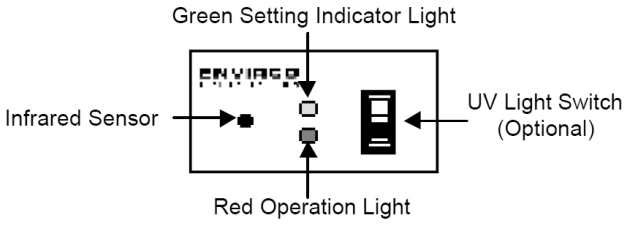

Figure 3: AirCeil™ IR Control Panel

AirCeil Flow-Set
The Flow-Set is a hand held Infrared Remote Controller configured to adjust the airflow of the AirCeil unit. The combined use of the Flow-Set Transmitter and the Infrared Sensor mounted on the control panel of the AirCeil, allows the motor to be turned "ON" or "OFF", adjustments to the airflow index (from 1-100) and confirms the current airflow setting.

Note: When any of the Flow-Set buttons are depressed, the Flow-Set Indicator Light will flash, indicating that a change has occurred.

During an adjustment session, the green Setting Indicator Light on the AirCeil Control Panel flashes each time a valid entry is made.

- The button to the left of the up arrow quickly increases to the airflow index by increments of ten (see Figure 4).
- The button to the left of the down arrow quickly lowers to the airflow index by increments of ten.

- Similarly, using the set of buttons to the right of the arrows 1 allows fine, single digit adjustments to the airflow index.
- If the airflow index is already set to its maximum value of 100, any further attempts to raise the airflow index using either the 10 button or the 1 button will not be allowed. The green Setting Indicator Light will not blink, indicating an invalid entry.
- With an airflow index of 91, depressing the 10 button will be considered an invalid entry. The green Setting Indicator Light will not blink and the increase will not occur because this entry would take the airflow index above 100.
- The 1 and 10 buttons respond in a similar manner during any attempts to set the airflow index below 1 because 0 is not a valid airflow index.

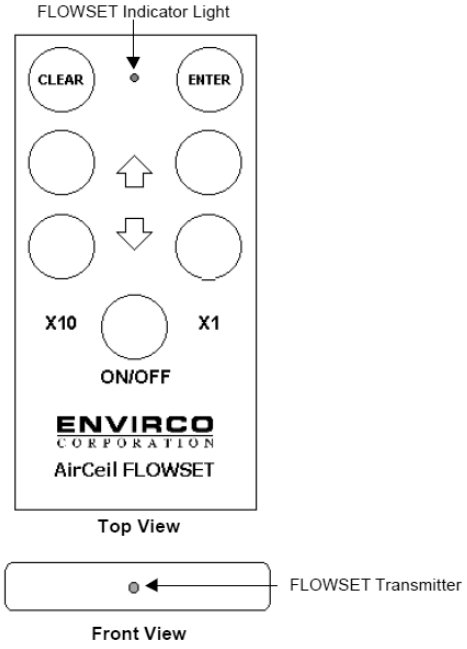

Figure 4: AirCeil™ FlowSet IR Remote Controller

Turning the AirCeil "ON" (Run Mode)

1. Point the Flow-Set Transmitter toward the Infrared Sensor on the AirCeil control panel.
2. Press the ON/OFF button once and the both the red operation light and the green setting light will glow confirming the unit is "ON."
3. Press the Enter button to confirm that the unit is in the Run Mode and to display the current airflow setting.
4. In the Run Mode only the red operation light will remain lit.

Temporarily Turning the AirCeil "OFF" (Standby Mode)

1. With the AirCeil "ON", press the ON/OFF button once to temporarily stop the unit.
2. The red operation will turn "OFF", but the green Setting Indicator Light will remain lit indicating the unit is in the Standby Mode.
3. After 15 minutes of inactivity, the unit will resume operation at its current airflow setting.
4. The Airflow Indicator Light on the AirCeil control panel will now glow red,confirming that the unit is now back in the Run Mode.

Turning the AirCeil "OFF"

1. With the AirCeil "ON", press the ON/OFF button once and the unit will stop temporarily and the Setting Indicator Light will glow green, confirming that the unit is in the Standby Mode.
2. Press the Enter button once to prevent the unit from resuming after 15 minutes of inactivity.
3. The green Setting Indicator Light will flash, showing the last programmed airflow setting.
4. The motor will ramp up temporarily and then turn "OFF."
5. When the AirCeil is not in operation, both the red and green indicator lights will be turned "OFF."

Motor Speed or Airflow Adjustment Session

1. Point the Flow-Set Transmitter toward the Infrared Sensor.
2. Press the ON/OFF button or any of the four arrow buttons and the Setting Indicator Light will glow green, indicating an airflow adjustment session is in process.
3. Continue to press the appropriate arrow buttons to reset the AirCeil to the new airflow setting.
4. Press the Enter button to accept the new airflow setting and to exit the adjustment session.
5. Pressing the Clear button prior to hitting the Enter button to delete the new setting and revert back to the original airflow setting.
   Note: If the Controller's buttons are inadvertently depressed or you enter an adjustment session but do not modify the airflow setting, the adjustment session automatically terminates after 15 minutes of inactivity.

Viewing the Current Motor Speed or Airflow Setting

1. With the unit in the Run Mode, depress the Clear button once.
2. The green Airflow Setting Indicator Light begins to flash indicating the signal was received.
3. The green flash sequence indicates the current airflow index (1-100).
4. The green flash sequence occurs in two sets, with first set of long flashes representing the tens digit setting and the second set of short flashes representing the single digit setting.
5. An extra long flash replacing either the long flash(es) or the short flash(es) indicates the value of the corresponding tens digit or single unit digit setting is zero.

- Example 1: Two long flashes followed by four short flashes represents an airflow index of 24. The motor will be operating at approximately 24% of its maximum capacity.
- Example 2: Eight long flashes followed by nine short flashes represents an airflow index of 89. This setting indicates that the motor is operating at approximately 89% of its maximum capacity.
- Example 3: An extra long flash followed by four short flashed represents an airflow index of 04 or that the motor is running at 4% of capacity.
- Example 4: Nine long flashes followed by an extra long flash represents a flow index of 90 or that the motor is running at 90% of capacity.

■ Airflow Configuration

Note: Turn the AirCeil "ON" and let it run for a 15-30 minutes to ensure a clean environment is established when running the unit in the recirculation mode. Alternatively, a permanently mounted or handheld room pressure monitor can be used to confirm room conditions meet the latest CDC guidelines for a negative pressure isolation room.

Complete Air Recirculation

1. Install the optional Ceiling Filtered Air Diffuser (Part No. 63841) in a standard 2' x 4' T-bar ceiling grid with a 2' x 2' blank off panel.
2. Use clear, flexible 12-inch ducting (Part No. 63842) to connect the optional Ceiling Filtered Air Diffuser to the AirCeil exhaust collar.
3. The AirCeil has the capacity to recirculate up to 600 ft3/min of air.
   Note: The actual capacity of the AirCeil will depend on several factors unique to each facility and may include, but shall not be limited to the length and number of bends in the flexible ducting, the type of prefilter used and the voltage supplied.
4. The room air change rate the AirCeil unit will generate depends on both the AirCeil airflow index setting and the size of the room. See Table 1 in the Appendix for representative room air changes per hour (ACH).
5. The flexibility of placement of the AirCeil unit relative to the Ceiling Filtered Air Diffuser can optimize the needs of the patient, healthcare workers and the specific activities within the room.
6. Positioning the AirCeil away from the foot of the bed and the Ceiling Filtered Air Diffuser directly above the bed or area of activity (see Figure 11) allows clean air to be constantly swept across the patient. This may be beneficial for an immune compromised patient.
7. To minimize the spread of airborne contaminants generated by the patient, position the AirCeil toward the head of the bed and the Ceiling Filtered Air Diffuser downstream from the foot of the bed (see Figure 12). This allows clean air to sweep past healthcare workers and visitors while removing airborne contaminants generated by the patient.

Total Air Exhaust Mode (Negative Pressure)

1. Attach any 12-inch ducting to the AirCeil exhaust collar.
2. The HEPA filtered exhaust air can be vented either to the outside or returned to the main HVAC system[2].
   Note: Verified that the ducting and the external exhaust motor/blower can handle the air volume exhausted by the unit.
3. The AirCeil has the capacity to exhaust up to 600 ft3/min of air.
   Note: The actual capacity of the AirCeil will depend on several factors unique to each facility and may include, but shall not be limited to the length and number of bends in the flexible exhaust ducting, the type of prefilter used and the voltage requirements.

Initial Start-Up Testing and Certification

Note: The CDC requires that quantitative leakage and filter performance tests be performed at initial installation and every time the filter is changed or the AirCeil unit moved. These tests should be repeated every 6-12 months. The factory tests should not be substituted for the initial test.

1. Initial on-site testing and certification of the Hospi-Gard AirCeil is included with the purchase of each unit within the Continental United States.
   Note: Operation of the unit prior to authorized certification may void the warranty.
2. The following services shall be performed at the time of initial on-site testing and certification.
3. Test the HEPA filter quantitatively for leakage and to verify filter performance. Any leaks detected will be repaired or the filter will be replaced as required.
4. Confirm the maximum capacity of the AirCeil unit is 600 ft3/min ± 10% when the airflow index is set on its maximum value of 100 and the unit free of optional carbon or anti-microbial prefilters and any ducting attached to the AirCeil collar.
5. Test ground leakage and ground continuity for electrical safety.
6. Contact an Authorized Service Contractor to arrange a certification date.

Authorized Service Contractor: ENV Services, Inc. | 800-345-6094

■ Negative Pressure

CDC guidelines[2] recommend that rooms used for negative pressure isolation should be single patient rooms with negative pressure relative to the corridor or other areas connected to the room. The minimum pressure difference necessary to achieve and maintain negative pressure that will result in airflow into the room is 0.001 inch W.G. (a higher pressure is preferred). To achieve this, the exhaust flow should be 10% or 50 CFM greater than the room supply air, whichever is greater.

Achieving Negative Pressure

Note: It is the responsibility of the purchaser and not ENVIRCO Corporation to ensure the room in which the AirCeil unit is used to create the negative pressure is in compliance with CDC guidelines[2] for a negative pressure isolation room and monitored to ensure its continuing performance.

1. Each AirCeil has the capacity to exhaust up to 600 ft3/min of air.
2. The attachment of ductwork to the exhaust port decreases the air handling capacity of the AirCeil unit. The magnitude of the decrease will vary depending on the length and type of duct as well as its configuration. For example, a 10-foot run of standard flexible duct containing two 90-degree bends will reduce the exhaust capacity by approximately 100 cfm.
3. A room pressure monitor can be used to confirm the room conditions meet the latest CDC guidelines for a negative pressure isolation room.

[2] CDC. Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Facilities, 1994. MMWR, October 28, 1994; 43 (no. RR-13.)

Difficulty Achieving Negative Pressure
Note: The AirCeil has the capacity to exhaust up to 600 ft3/min of air, however the actual capacity will depend on several factors unique to each facility and may include, but shall not be limited to the length and number of bends in the flexible exhaust ducting, the type of prefilter used and the voltage requirements.

1. The equipment may not be able to achieve or maintain negative pressure in conformance with the CDC guidelines due to issues with the existing building ventilation system or air leaks within the negative pressure room.
2. The room should be inspected for any possible source of air leakage through doors, windows, plumbing and equipment wall penetrations.
3. Take appropriate corrective action should be taken to seal the leaks.
4. If negative pressure cannot be attained, an additional AirCeil may be required.

■ Service

Note: Proper protective equipment and measures must be used at all times during unit cleaning. Check with your Safety Office to assure the cleaning solutions, protective equipment (disposable hospital gown, NIOSH approved respirator, protective gloves) and protocols followed comply with your facility's guidelines.

Cleaning the Unit
1. Periodic Cleaning of the unit may be done with a mild disinfecting solution or a mild bleach solution.
2. Cleaning must be performed with the unit running. Wipe the exterior of the unit with a damp sponge or cloth. Be careful not to saturate the unit or the filter. Carefully clean the unit, paying particular attention to the prefilter intake grille.

Prefilter Replacement (Refer to CDC Guidelines)
NOTE: The unit must be running during prefilter replacement.

1. The prefilter should be replaced every 60-90 days, depending on the environment. Regular replacement of the prefilter will maximize the life of the HEPA filter.
2. Wipe the unit as described in the Section 6.1.1.
3. Spray a mist of phenolic disinfectant such as, "Amphyl" or "Lysol" into the air intake grille, covering the entire prefilter area.
4. Open the room-side Filter Access Panel using the latch key to unlock the three tamper resistant panel latches by turning in the direction indicated in Figure 5 below.
5. Remove the three (3) Prefilter Retainer Slats by shifting them through the cutouts in the prefilter screen (Figure 6).
6. Insert hand into red plastic medical waste disposal bag. Grasp the top corner of the prefilter with bagged hand and gently pull outward.
7. Turn bag inside out over prefilter and close bag for containment. Use closure strip tie to seal bag.
8. Position new prefilter in the prefilter screen. Ensure the edges of the prefilter are tucked neatly under screen flanges.
9. Replace the Prefilter Retainer Slats.

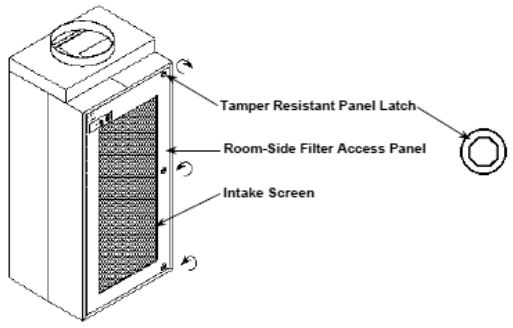

Figure 5: Filter Access Panel with Tamper Resistant Panel Latch

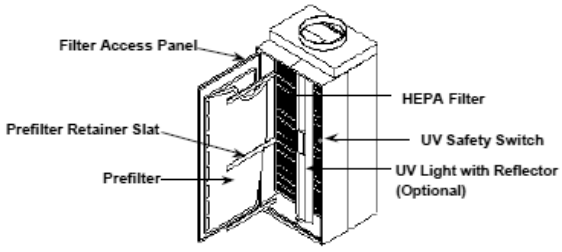

Figure 6: Filter Access Panel with Prefilter

HEPA Filter Replacement
Note: Decontaminate the unit before replacing the HEPA filter. Only technicians trained and experienced in decontamination and performance evaluation of clean air equipment should perform this procedure.

Note: A procedure for formaldehyde gas decontamination is provided in the Unit Decontamination section; however, contact your Safety Office to confirm that this procedure complies with your facility's guidelines.

Note: Always use a NIOSH approved respirator and other protective equipment and clothing before replacing the HEPA filter using your Safety Office approved procedures.

Note: Turn the unit off and disconnect from power source before HEPA filter replacement or before attempting service.

1. Open the Filter Access Panel as described in the previous section.
   Note: If the unit includes an optional UV Germicidal Light with Reflector, it must be removed before the HEPA filter can be accessed.
2. While supporting the HEPA filter by its aluminum frame, remove the six (6) filter clips and bolts and lower the HEPA filter (Figure 7) from the AirCeil unit. Slip a red plastic medical waste disposal bag over the HEPA filter from the top down. The top of the HEPA filter downward and wrap the bag over the bottom end and seal the bag.
3. Remove the new HEPA filter from its container and carefully install in reverse order of removal.
   Caution: Handle the HEPA filter with extreme care, touching only the sides of the HEPA filter's aluminum frame. Never touch the white HEPA filter pleats. Even a light touch on the filter surface may damage the filter.
4. A quantitative leakage and filter performance test should be performed each time the filter is changed.

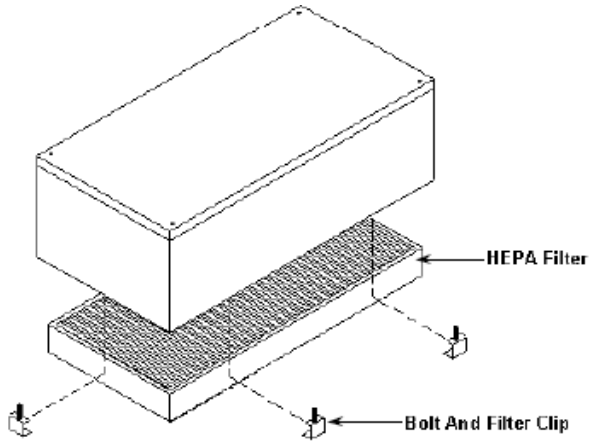

Figure 7: HEPA Filter and Filter Clip Locations

Motor/Blower Lubrication
The AirCeil motor/blower comes equipped with sealed for life bearings and requires no lubrication.

Relocating a Contaminated Unit

Note: Decontaminate before relocating a contaminated AirCeil unit. Always use a NIOSH approved respirator and other protective equipment and clothing when relocating the AirCeil unit following your Safety Office approved procedures. See CDC recommendations for unit relocation.

1. With the AirCeil unit “ON”, remove and replace the prefilter as described in the Service section.
2. Clean the exterior surfaces of the unit as described in the Service section.
3. Turn the unit “OFF” and disconnect it from the power source.
4. Decontaminate the AirCeil as described in the section below.
5. Perform a leakage and filter performance test prior to using the relocated unit.

Note: CDC guidelines require that a quantitative leakage and filter performance test should be performed each time the unit is relocated. A list of licensed testing organizations is available on request from ENVIRCO Corporation.

Unit Decontamination

Formaldehyde Decontamination
Should decontamination of the unit be required, the following is an adaptation by Annex G. of the Recommended Microbiological Decontamination Procedure from NSF 49, May 1992. Confirm with appropriate Biosafety and Industrial Safety Professionals that the procedures meet your facility’s guidelines.

1. Transport the unit as described in the Service section to a controlled access, non-public area with a non-porous floor, good ventilation and a dedicated exhaust directly outside the building. Attach and seal a flexible hose to a dedicated exhaust. Place the other end of the exhaust hose near the unit.
2. The total volume of the AirCeil is 13.85 ft3 (24 in. x 52 in. x 20 in.)
3. Multiply the total volume of the unit by 0.3 g/ft3 to determine the gram weight of paraformaldehyde required. Decontamination of the AirCeil requires 4.2 g (13.85 ft3 x 0.3 g/ft3) paraformaldehyde.
4. Wipe down the filter access panel with an appropriate surface decontaminant.
5. Open the hinged filter access panel and place an unplugged heating device, such as a commercially available electric frying pan with the thermostat set at 232.2° to 246.1° C (450° to 475° F) inside the unit through the opened filter access panel. Spread the paraformaldehyde evenly over the heating surface of the electric frying pan.
   Caution: The auto-ignition temperature of paraformaldehyde is 300° C (572° F).
6. Place a hot plate, beaker of water, temperature and humidity indicators in the unit next to the pan that will contain the paraformaldehyde.
7. Enclose the unit completely with heavy gauge plastic film and tape. The optional power cord should be coiled and taped to the unit and sealed under the plastic film. Seal the film to the floor on which the unit stands.
8. Determine the temperature and humidity inside the unit.
9. The temperature should be 21.1° C (70° F) or higher with a humidity level between 60% to 85%. Use the hot plate to heat the beaker of water unit the desired temperature and humidity are achieved. Disconnect the hot plate.
10. Carefully seal around the power cord extending from the electric frying pan so that formaldehyde gas will not leak out.
11. Plug the cord of the electric frying pan into an outlet.
12. After the paraformaldehyde has de-polymerized, disconnect the frying pan from the electrical outlet.
13. Allow the unit to stand for a minimum of two hours or overnight.
14. Attach the flexible hose to the unit and allow it to draw from inside the unit.
15. After 15 minutes of visible exhaust activity, small openings in the film sealing the unit may be made over to improve ventilation.
16. Allow the unit to ventilate overnight.
17. Remove the unit from exhaust ventilation when the formaldehyde gas has been exhausted.
18. During unit decontamination, respiratory protection for service personnel is recommended. Only National Institute for Occupational Safety and Health (NIOSH) approved respirators should be used.
19. Remove the filter as described in the Section 6.3. The filter can now be disposed of as general waste.

Phenolic Disinfectant
In facilities where formaldehyde gas decontamination is prohibited or not feasible, the unit can be disinfected with the following phenolic procedure.

Note: The unit must be running during phenolic disinfection.

1. With the AirCeil ”ON”, remove the prefilter as described in Service section.
2. Close the filter access panel and with the unit running, spray a mist of phenolic disinfectant such as Amphyl or Lysol into the intake screen.
3. Continue spraying the entire filter access area until the HEPA filter is saturated.
4. Remove the HEPA filter as described in the Section 6.3. Since the filter has not been decontaminated by the formaldehyde procedure, it must be placed in a red medical waste bag and disposed of properly.

■ Troubleshooting

Note: Disconnect the unit from the electrical power source before attempting service.
Note: Always use a NIOSH approved respirator and other protective equipment and clothing before attempting to service or repair the unit using your Safety Office approved procedures.

Inoperative Air Flow
1. Confirm that the optional power cord is plugged into a properly functioning building receptacle or that the unit is properly hard-wired to the main electrical system and that power is present.
2. Confirm that the batteries to the Flow-Set or hand held IR Remote Controller are charged.
3. Confirm that the Flow-Set Transmitter is pointed directly toward and is no more than 10 feet from the Infrared Sensor mounted on the control panel of the AirCeil.
4. Confirm that the unit is turned “ON” and that the red Operational Light is lit.
5. If the green Setting Light is lit, the unit is in the Standby Mode. Press the Enter button to resume operation, or if nothing is done, the unit will resume operation at its last accepted setting within fifteen minutes.
6. Ensure that the airflow index is properly set from 1-100 and press the Enter button to accept the setting if it is at the desired rate or reset to the correct setting.

Low Air Capacity
1. Check prefilter for obstruction and remove obstruction as necessary.
2. Replace the prefilter media.
3. Check power supply for proper voltage, amperage and distribution frequency.
4. With the unit in the Run Mode, depress the Clear button once to ensure that the airflow index is properly set from 1-100. Press the Enter button to accept the setting if correct or reset if incorrect.

High Air Capacity
1. Check power supply for proper voltage, amperage and distribution frequency.
2. With the unit in the Run Mode, depress the Clear button once to ensure that the airflow index is properly set from 1-100. Press the Enter button to accept the setting if correct or reset the index is set too high.

For further help with troubleshooting, please contact ENVIRCO Technical Support:

ENVIRCO
101 McNeill Road
Sanford, NC 27330
Tel: 800.884.0002
Fax: 919.774.8771

Wiring Diagram

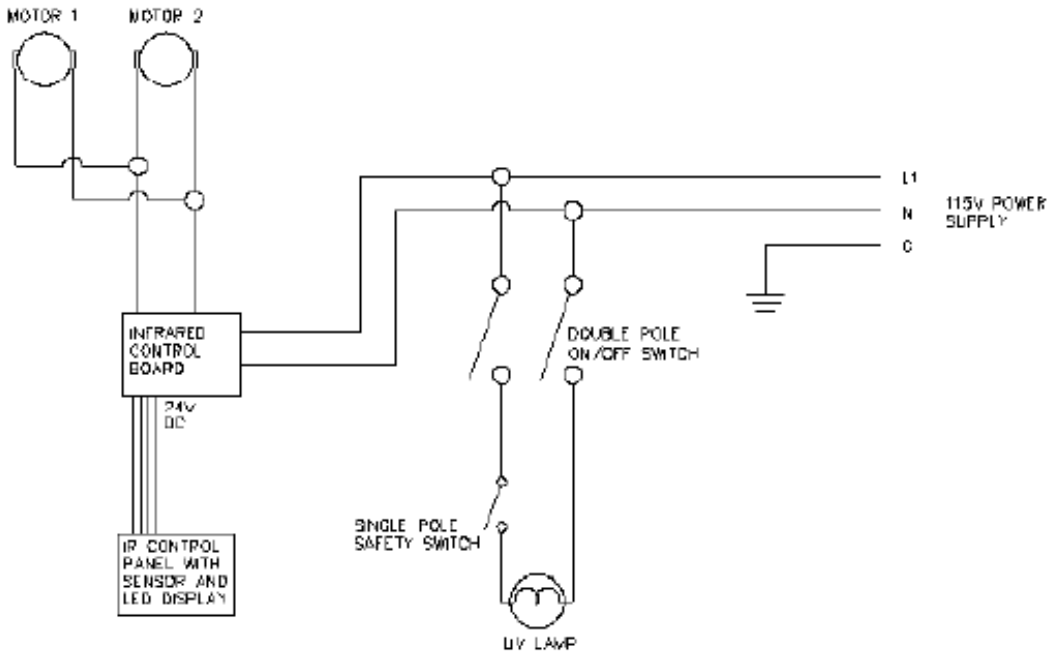

Figure 8: AirCeil™ Wiring Diagram

Specifications*

Dimensions	AirCeil Unit: 23.62 in. D x 47.62 in. W x 19.5 in. H Exhaust Collar: 2.0 in H x 12.0 in. Diameter.
Weight	78 lbs.
Power Requirements	115 V, Single Phase, 60 Hz 1.4 Amps at 600 ft^3/Minute Full Load Amps: 2.25
Power Connection	Standard 7/8-inch Conduit Knock-Out
HEPA Filter Media	99.99% at 0.3 Micron Minimum Efficiency
Prefilter	Woven Polyester Media in a Removable Frame
Motor	2 ea. 128 Watts, Direct Drive, Continuous Duty with Sealed-for-Life Bearings
Sound Level	50-55 dBA (Ambient Sound Level < 40 dBA), Measured 30 Inches from the Filter Face

*Designs and specifications are subject to change without notice and without incurring liability or modifications to equipment previously sold.

Parts List

Description	Qty. Required	Part No.
Blower/Motor	2	63829
Capacitor	1	63223
HEPA Filter (19.88” x 43.88” x 3”)	1	69391-033
Prefilter Slat	3	38168-001
Prefilter Media	1	24375-001
Flow-Set, IR Remote Controller	1	63011
Panel Latch	3	63843
Panel Latch Key	1	63844
Optional Accessories		**Part No.**
Eyebolts	4	62529
Hospital Grade Power Cord (12 ft/115v)	1	23888
Charcoal Prefilter	1	24365-001
Ceiling Filtered Air Diffuser with 12-in Collar	1	63841
Clear, 12-in, Flexible Ducting (per/ft)	1	63842
UV-C Germicidal Light with Reflector, 30 Watt	1	23466-001
Room Pressure Monitor	1	63337
Annunciator	1	63338

Parts Location

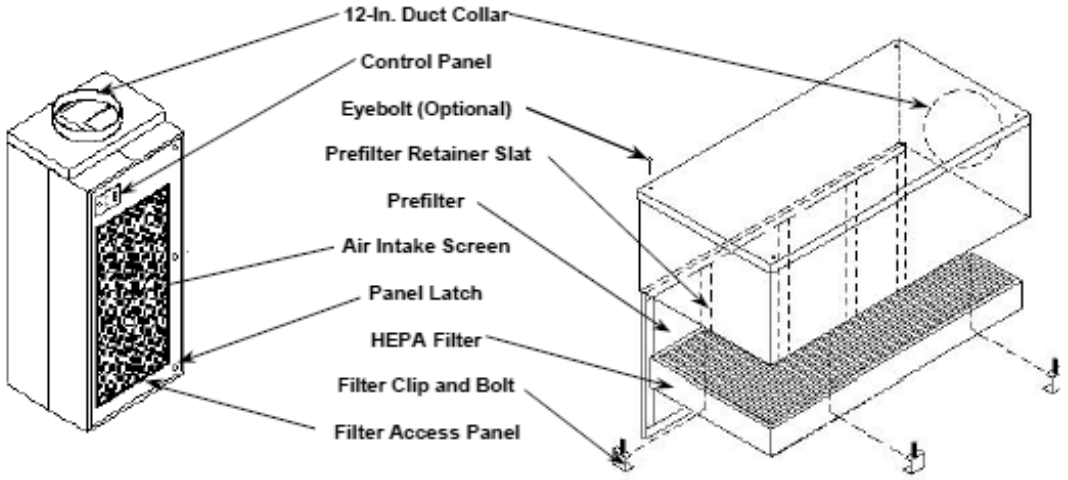

Figure 9: AirCeil™ Parts Location

Optional Accessories

Hospital Grade Power Cord
If purchased with an optional power cord, insert the plug into a properly grounded three pronged receptacle.

Charcoal Prefilter
Carbon prefilters integrate odor control capabilities to the AirCeil Unit. Carbon prefilters help control the odors from cigarette smoke, perfume, urine and much more. Carbon impregnated filters generally last 30-60 days.
Note: AirCeil Unit can accommodate either the optional charcoal prefilter or the optional antimicrobial prefilter, but is not designed to accommodate both.

Antimicrobial Prefilter
Antimicrobial treated polyester prefilters inhibit the growth of microorganisms (85-90% resistance) on the primary HEPA filters. These filters should be changed every 30-60 days.
Note: AirCeil Unit can accommodate either the optional antimicrobial prefilter or the optional charcoal prefilter, but is not designed to accommodate both.

Ceiling Filtered Air Diffuser
- Required for use in the Total Clean Air Recirculation Mode.
- Fits in a standard 2' x 2' ceiling grid section.

UV-C Germicidal Light with Reflector
Warning: The Charcoal Prefilter must be used with the UV Germicidal Light.
Warning: Never override the safety switch located behind the front panel.
Note: As a safety precaution, the UV Light Safety Switch located just inside the Filter Access Panel door frame will automatically inactivate the UV Light whenever the Filter Access Panel is opened.

Operating the UV Germicidal Light
- For units with the optional UV Germicidal Light with Reflector, locate the "ON/OFF" toggle switch located on the Control Panel (Figure 3.)
- Press "ON/OFF" toggle switch to the "1" position to turn the UV Light "ON".
- Press the "ON/OFF" toggle switch to the "0" position to turn the UV Light "OFF."

Removing the UV Germicidal Light
Caution: The unit must be decontaminated prior to opening the door panel to remove or service the UV Germicidal Light.
Caution: Confirm that the AirCeil Unit is disconnect from its power source before attempting to remove the UV Germicidal Light.
Caution: When removing the UV Light, avoid touching the white HEPA filter pleats. Even a light touch on the filter surface may damage the filter.
1. Open the Filter Access Panel as described in the Section 6.2.4.
2. Remove the white, green and black wires from the routing clamps on the light reflector.
3. Remove the all three UV light wires (white, green and black) leading from the power source to the UV ballast at the insulated wire connectors (located near the ballast.)
4. Remove the nuts and washer from the end of the light reflector channel located on the end opposite the Control Panel.
5. Remove the hardware (nut, screw and washers lock and flat) from the Lamp Mount Channel.
6. Carefully, shift the UV Germicidal Light with Reflector towards the lamp mount angle until it can be slid to the right (away from the door hinge.)

Caution: Ensure that the HEPA filter media is not damaged by the UV Germicidal Light as it is removed from the AirCeil Unit.

Appendix

AirCeil Room Changes per Hour with Varying Room Sizes

	Room Size (Room Air Volume)					
Fan Speed	10' x 10' x 8' (800 ft^3)	12' x 12' x 8' (1150 ft^3)	12' x 15' x 8' (1440 ft^3)	12' x 15' x 9' (1620 ft^3)	15' x 15' x 8' (1800 ft^3)	15' x 20' x 8' (2400 ft^3)
Index 30 (300 ft^3/min)	22.5 ACH	15.6 ACH	12.5 ACH	-	-	-
Index 65 (450 ft^3/min)	33.8 ACH	23.5 ACH	18.8 ACH	16.7 ACH	15.0 ACH	-
Index 100 (600 ft^3/min)	45 ACH	31.3 ACH	25 ACH	22.2 ACH	20 ACH	15 ACH

Table 1: Representative Room Air Changes per Hour (ACH)

Calibrating the AirCeil

1. The airflow index does not represent the actual airflow capacity of the unit. The index represents only the percentage of capacity at which the motor is operating.
2. The actual air volume generated by the AirCeil should be verified using a calibrated airflow measurement device.
3. Determine the room air volume by multiplying the width, length and height of the room in feet.
4. In the air recirculation mode, the CDC recommends that 12 or more air changes per hour (ACH) be established.
5. Multiply the desired ACH (12 or more) by the volume of the room and divide by 60. This is the CFM setting that will provide the desired ACH for the room.
6. Using a calibrated airflow measurement device, set the AirCeil at the airflow capacity.
   Note: If the desired air capacity cannot be attained, an additional AirCeil may be required.

Air Volume Measurement

- Test Equipment: ShortRidge with 24" X 48" flow hood.
- Test Procedure: Place the flow hood over the intake screen. Take three sets of readings with the airflow index set to 100 (full speed.)

Full Speed (airflow index at 100)

Uncorrected	**Corrected**
_____	_____
_____	_____
_____	_____

Average of Corrected _____
Acceptable Range: 600 cfm ± 10% on full speed

HEPA Filter Leak Test

Test Equipment

- "DOP" generator with Laskin type nozzles or equivalent
- Aerosol photometer with a linear or expanded logarithmic scale (calibrated)

Test Procedure

1. Set the speed setting index to 55% (5 long flashes – 5 short flashes.)
2. Place the photometer probe in the exhaust collar.
3. Move the aerosol generator hose to all possible leak locations (check the perimeter of the filter seal, the entire filter face and the back panel of the unit).
4. Acceptance: DOP penetration not to exceed 0.03%.

Positioning the AirCeil within a Patient Room

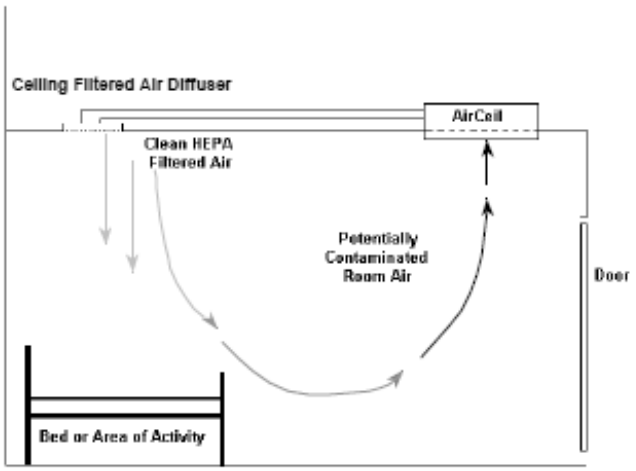

Figure 11: 100% Air Recirculation Configuration 1

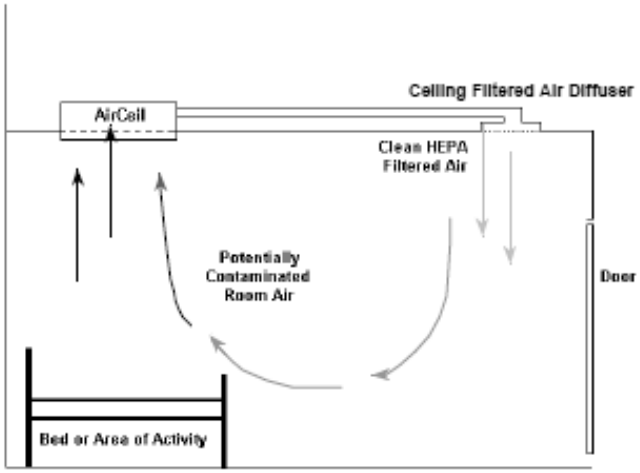

Figure 12: 100% Air Recirculation Configuration 2

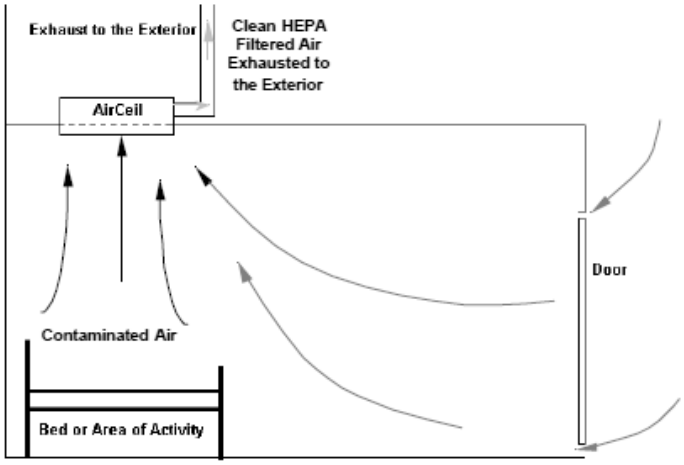

Figure13: Negative Pressure Room

Limited Warranty

ENVIRCO warrants that all equipment manufactured by it and bearing its name will be free from defects in materials and workmanship under normal use. The obligation of ENVIRCO under this warranty is limited to repair or replacement of any parts that are defective for a period of one year after invoice date, provided that ENVIRCO receives written notice of such defect. For a period of 90 days after invoice date ENVIRCO may effect such repairs or replacement, via ENVIRCO Service personnel, at the equipment installation site provided that the equipment is located in the continental United States and that Envirco receives written notice of such defect. Excluded from this warranty are certain expendable items such as light tubes, filters, etc., as well as damage due to abuse or accident. Except for this warranty ENVIRCO makes no warranty, expressed or implied, including but not limited to, those of description, quality merchantability, sample, fitness for a particular purpose or productiveness.

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