

AAF-HermanNelson® Classroom Unit Ventilators Model AEQ, AED Floor Mounted Self-contained Heat Pump

WHAT IS A UNIT VENTILATOR?

Your unit ventilator can be classified as a kind of classroom "thermal handyman." Unit ventilators maintain a clean, comfortable, healthy environment automatically. They heat, ventilate and provide natural cooling (with outdoor air) or mechanical cooling.*

Your room temperature should be neither too hot nor too cold. The unit ventilator provides just the right amount of properly conditioned air to meet the needs of various types of activity throughout the day.

If the air being discharged by the unit feels cold to your hand, it is because the room needs this cooling effect to prevent overheating.

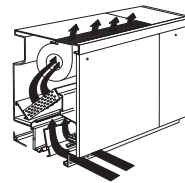
Please observe these simple rules to assure efficient operation of your unit ventilator.

1. Keep doors and windows closed to allow the unit to function properly.
2. DO NOT attempt to adjust the unit thermostat. Ask the custodian or other authorized person to make adjustments if needed.

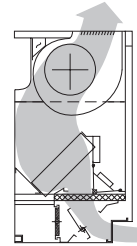
*Refrigeration cooling is used instead of outdoor air during warm weather.

HOW YOUR UNIT VENTILATOR WORKS

Return Air Mode

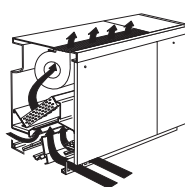


The Unit Ventilator will be sending heated room air into your classroom. Usually this occurs before occupancy.

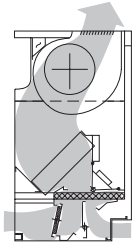


Fast morning warm-up using 100% recirculated room air.

Mixed Air Mode

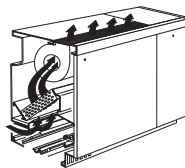


The Unit Ventilator will be sending a mixture of room air and fresh outdoor air into your classroom. This usually occurs intermittently all day long.

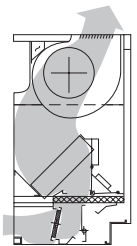


Unit maintaining desired room temperature.

O.A. Ventilation Mode



The Unit Ventilator will be sending only fresh, outdoor air into your classroom to cool the room, counteracting the heat generated by the pupils, lights and sun. This also may occur intermittently all day long.



Natural cooling using maximum outdoor air.

OPERATION

GENERAL — The model AEQ features self-contained heating and cooling utilizing a refrigeration system which either extracts heat from or puts heat into the outside atmosphere. The unit is also capable of providing free cooling by automatically delivering maximum outdoor air. **Please read this bulletin carefully. It is important to understand how the unit operates.** A properly maintained unit should provide years of troublefree service.

UNIT OPERATION — Place the main power "on-off" switch, accessible under the access door (see Figure 1), in the "ON" position. This switch should remain in the "ON" position except when servicing the unit or when the unit is to be shut down for an extended period.

ROOM AIR FANS — The room air fans will run continuously during the occupied period. During the unoccupied period

(night setback), the fans will run only on a call for heat or cooling.

NOTE: When the unit is not furnished with any type of night setback arrangement, the fan will run continuously unless the unit is manually turned off.

COOLING — Mechanical cooling is provided by a sealed refrigeration system whereby heat from the room is absorbed by the refrigerant in the indoor coil and through the action of the compressor is transferred to the atmosphere via the outside refrigerant coil. The unit is capable of bringing in maximum outside air to cool the room. Therefore, the refrigeration system only operates during those periods when the outside temperature is too warm to cool the room.

OPERATION (CONTINUED)

HEATING — The refrigeration system includes a “reversing valve” which can reverse the operation of the refrigeration system so that heat from the atmosphere is absorbed by the refrigerant in the outside refrigerant coil and transferred to the room air coil where it is used to heat the room. This is the “Reverse-Cycle Refrigeration” or “Heat Pump” mode of operation.

Whenever heating is required, Models AEQ and AED operate as a heat pump. As long as it is possible to maintain the desired room temperature, only the reverse-cycle refrigeration operates. However, when additional heating is required, an electric resistance coil is activated in stages to supplement the heat produced by the reverse cycle system.

NOTE: The microprocessor software program prevents the operation of the electric resistance heat when the outdoor temperature is above 20°F except during defrost cycle or if the emergency electric heat switch is in the emergency heat position.

DEFROST — When the unit is in the heating mode, the outdoor coil may operate at temperatures low enough to form frost on the outdoor coil. The frost will tend to block the flow of air through the outdoor coil and reduce the efficiency of the machine. The unit has an automatic defrost cycle which operates at a factory set interval of 90 minutes, but only if the coil surface temperature is below 28°F. The timer (see

Figure 1) is field adjustable for a 30 or 45 minute interval. During the defrost cycle, the refrigeration system operates in the cooling mode except with the outdoor fan off. With the outdoor fan off, the temperature of the outdoor coil increases rapidly and causes the frost to melt. During the defrost cycle electric heat is energized in steps as required to avoid uncomfortably low discharge air temperature into the room.

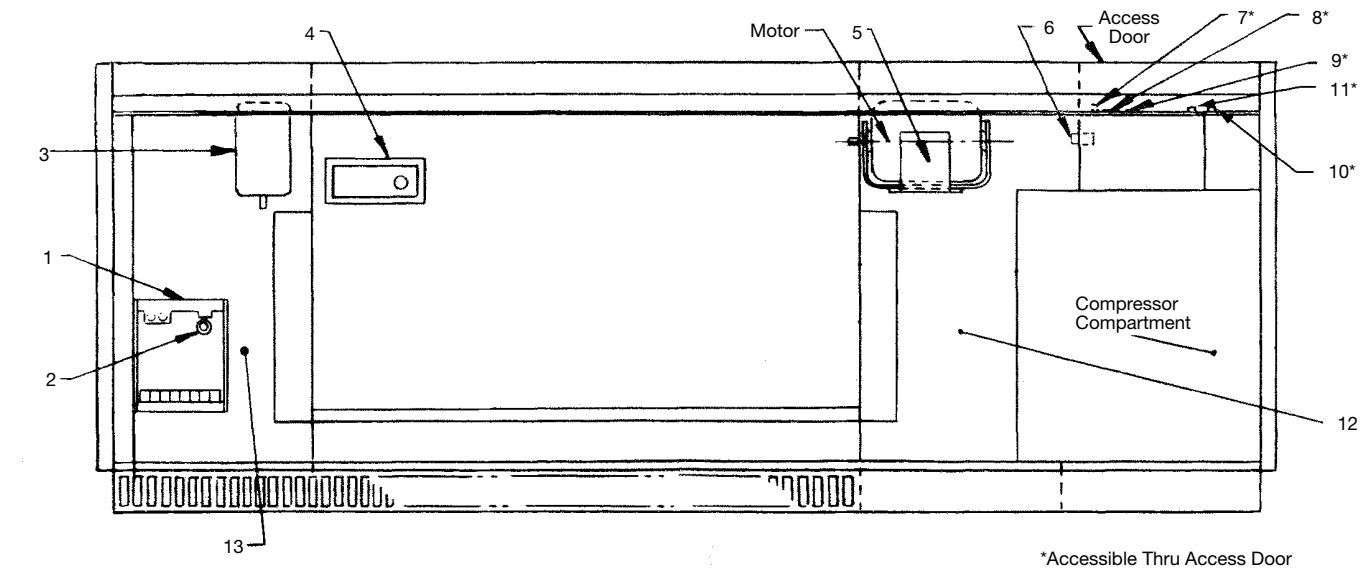
Under certain atmospheric conditions the initiation of the defrost cycle will cause a “puff” or larger quantity of water vapor to be released to the outside. The characteristic sound of the reversing valve will also be heard when the defrost cycle starts and stops. These phenomena are normal events and should cause no alarm.

UNOCCUPIED (OPTIONAL) — During the unoccupied period the unit is turned off by the network software on network unit or on stand-alone units by the optional unit mounted timeclock or by de-energizing the control circuit through a remote device such as a timeclock or manual switch.

The unit will remain off unless the room temperature fall below the unoccupied setback temperature or rises above the unoccupied setup temperature. The outdoor air damper remains closed during the unoccupied period.

CONTROLS

Figure 1. Front view with access panels removed



*Accessible Thru Access Door

- | | | |
|---|--|------------------------------------|
| 1. MicroTech Unit Ventilator Controller | 6. Defrost Timer | 11. Emergency Electric Heat Switch |
| 2. Room Temperature Adjustment | 7. “High-Med-Low-Off” Motor Speed Switch | 12. Right End Compartment |
| 3. Damper Actuator | 8. Tenant Override Switch (Accessory) | 13. Left End Compartment |
| 4. Sampling Chamber | † 9. Holiday Switch (Accessory) | |
| † 5. Timeclock (Accessory) | 10. Unit Main Power “On-Off” Switch | |

† Not furnished with network units since the function is handled through the communication network.

MICROTECH UNIT VENTILATOR CONTROLLER — This is a factory mounted microprocessor-based DDC control device which is capable of stand-alone control or network control from a front end computer. The controller can support sixteen (16) inputs and sixteen (16) outputs. Each input supports either analog sensing and/or binary contact closure. Each output consists of a binary contact closure to operate controlled devices. The controller will provide status of either the outputs or the inputs upon request from a personal computer connected either to network or an individual con-

troller. The controller contains self-diagnostic capability to maintain constant reliability. The controller provides heating and cooling control in response to various inputs as well as the room sensor which may be either unit mounted or wall mounted. Damper actuators are precisely positioned by means of step and-wait parameters built into control software. Two-position functions such as DX cooling/heating and electric heating are also initiated by the controller. Room temperature adjustment, unoccupied temperature offset and outdoor air damper minimum position are all adjustable at the controller.

CONTROLS (CONTINUED)

In a network system, these three adjustments are not operative and are done as part of the network control plan.

The controller provides a visual means of fault detection with the use of a status LED on board.

ROOM TEMPERATURE ADJUSTMENT — This item controls the room temperature setpoint. Adjust the room temperature to the desired setting (may be unit mounted or wall mounted; see Figure 1 for unit mounted). To readjust the temperature setting move the dial in small increments and allow at least one hour to elapse before adjusting again. It is important to understand that the unit may be discharging cool air even during the heating season in order to prevent overheating of the space. Adjustment of the temperature setting should be based on the actual temperature of the space and not the temperature of air discharging from the unit. **In a network system, this adjustment is not operative and is done as part of the network control plan.**

DAMPER ACTUATOR — This device positions the outdoor and room air dampers in response to the unit ventilator controller. It is factory mounted, wired and adjusted. See Figure 1.

SAMPLING CHAMBER — This enclosure houses the room air sensor whenever a unit mounted sensor is specified. Room air is continuously drawn through the sampling chamber to insure fast, accurate response to temperature changes within the room. See Figure 1.

TIMECLOCK (ACCESSORY) — This device automatically cycles unit through occupied and unoccupied modes in accordance with a user programmed time schedule. Programming instructions are included. The timeclock has battery back-up so it will not require resetting if electric power is interrupted. It is located in front of the room air fan motor. See Figure 1. **It is not furnished with network units since the function is handled through the communication network.**

DEFROST TIMER — When the unit is in the heating mode, the outdoor coil may operate at temperatures low enough to cause frost to form on the outdoor coil. The unit has an

automatic defrost cycle which operates at a factory set interval of 90 minutes, but only if the outdoor coil surface temperature is below 28°F. The timer is field adjustable for a 30 or 45 minute interval. See Figure 1.

“HIGH-MED-LOW-OFF” MOTOR SPEED SWITCH — This switch is provided so that the user may select the fan speed desired. For maximum heating or cooling capacity, depress the “High” button. For location, see Figure 1. The “Off” position shuts the unit down completely.

TENANT OVERRIDE SWITCH (ACCESSORY) — Allows the user to manually override the unit’s unoccupied mode for up to a pre-programmed two hours. The tenant override value is resettable from a personal computer connected either to network or an individual controller. The tenant override can also be part of the wall room sensor. See Figure 1.

HOLIDAY SWITCH (ACCESSORY) — This device is furnished with the optional timeclock. It permits manual changeover to unoccupied (night) control for extended or otherwise unscheduled periods. The switch must be manually returned to the normal (automatic control) position at the end of the “holiday” period for unit to operate on the automatic temperature control sequence. For location, see Figure 1. **Not furnished with network units since the function is handled through the communication network.**

UNIT MAIN POWER “ON-OFF” SWITCH - Disconnects main power to unit for servicing the unit or when unit is to be shut down for an extended period. See Figure 1.

EMERGENCY ELECTRIC HEAT SWITCH — Should the reverse cycle heating system become inoperative, this device allows the unit to be manually switched to emergency electric heat. This will permit the electric resistance heaters to operate as needed regardless of outdoor temperature. See Figure 1.

IMPORTANT: WHEN THE PROBLEM HAS BEEN REPAIRED AND THE REVERSE CYCLE HEATING SYSTEM IS AGAIN OPERATIONAL, THE EMERGENCY ELECTRIC HEAT SWITCH MUST BE RETURNED TO “NORMAL” IN ORDER TO PROVIDE THE MOST ECONOMICAL OPERATION.

SEQUENCE OF OPERATION

Also refer to the installation and maintenance bulletin for the MicroTech controller for additional control information and unit sequence of operation.

WALL MOUNTED ROOM AIR TEMPERATURE SENSORS

In addition to the unit mounted room air temperature sensor, a wall mounted room air temperature sensor is available as an accessory:

Wall Sensor With Tenant Override, Setpoint Adjustment and Communications Port. This provides thermistor temperature sensing, an LED unit mode indicator, a tenant

override switch to allow timed override from unoccupied to occupied mode, a setpoint offset adjustment potentiometer which allows the user to increase or decrease the current control setpoint by 3° F, and an RS-232 communications port to allow a portable PC with Monitor software to connect to the unit or network.

ROUTINE MAINTENANCE

FILTERS - Units are shipped with throwaway filters installed. To insure troublefree operation filters must be renewed or cleaned on a regular bases. DO NOT NEGLECT! To service filter, push "Off" button and remove middle front panel with $\frac{5}{32}$ " hex head wrench (see Figure 3).

TYPES OF FILTERS - All types of filters should be checked at least once a month or more frequently in areas with high dust or lint content.

1. **Throwaway** — (Glass fiber media in disposable cardboard frame.) Replace as required.
2. **Permanent** — (Metal media with metal frame.) Immerse and agitate in hot cleaning solution: 1½ pounds washing soda to each 10 gallons of water. Drain and dry. Spray or dip in filter oil and drain thoroughly.
3. **Renewable** — (Glass fiber media in metal frame.) Remove filter pad from the frame and discard. Replace with glass throwaway media cut to the proper size.

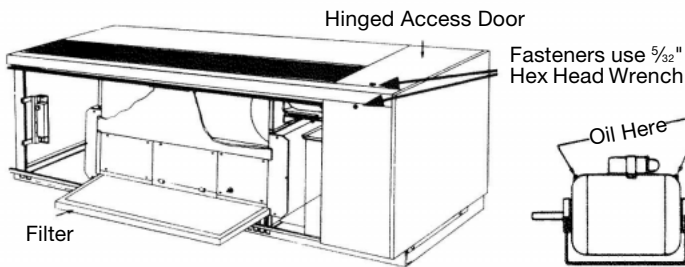


Figure 3.

ACCESS TO MOTOR FOR OILING IS THROUGH CENTER FRONT ACCESS PANEL.

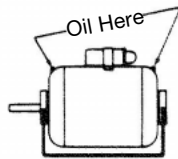


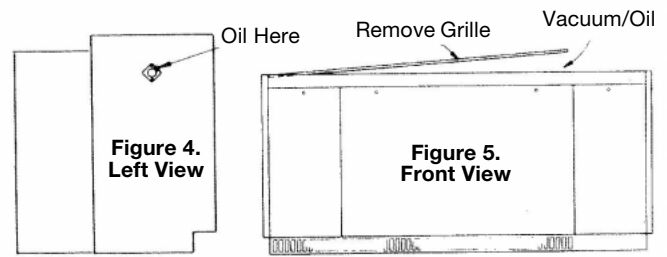
Figure 2.
Indoor Fan Motor

NOTE: Use of synthetic filter media is NOT RECOMMENDED.

OILING — Once every year add 3 drops of SAE 20 or 30 weight NONDETERGENT oil to each of the two oil holes (Figure 3) on the fan motor and fill the fan shaft bearing cup (Figure 4) at the opposite end of the fan shaft. Access to the oil points can be gained by removing the discharge grille with a crosspoint screwdriver.

CLEANING — The exterior cabinet surface should be kept clean and waxed. The fans and fan housings should be kept clean. This can be accomplished by removing the discharge grille with a crosspoint screwdriver (see Figure 5), Oiling the fan motor and fan shaft bearings can also be accomplished at this time.

IMPORTANT. AIR VENT OPENINGS IN THE FAN MOTOR MUST BE KEPT CLEAR.



ACCESS TO FAN SHAFT FOR OILING IS THROUGH LEFT FRONT ACCESS PANEL OR BY REMOVING GRILLE.

PERIODIC MAINTENANCE

Occasionally, if heating or cooling performance diminishes, the outdoor coil may require cleaning. This may be accomplished by either moving the unit away from the wall (see "Unit Removal" below) or by removing the outside air intake louver to gain access to the outdoor coil surface.

UNIT REMOVAL

To gain access to the rear of the unit, remove the entire Unit from the wall sleeve.

1. DISCONNECT ALL UNIT POWER SOURCES BEFORE PERFORMING MAINTENANCE OR REPAIR.
2. Remove both end panels.
3. Remove four nuts (two each end) from the wall sleeve mounting studs.

4. Break drain connection in the left end if necessary.
5. Move the unit away from the wall. This may be facilitated by prying chassis up and inserting short lengths of $\frac{3}{8}$ " diameter rod underneath it to serve as rollers or use optional accessory caster set to roll unit away from the wall.
6. Inspect and replace gasketing if required.

MAINTENANCE INSTRUCTIONS FOR INTERNAL CONDENSATE REMOVAL SYSTEM (IF FURNISHED)

DISCONNECT ALL UNIT POWER SOURCES BEFORE PERFORMING MAINTENANCE OR REPAIR.

BEFORE EACH HEATING SEASON, CLEAN ROOM SIDE DRAIN PAN BY FLUSHING WITH WATER. POUR WATER INTO LEFT END OF DRAIN PAN AND ALLOW IT TO DRAIN OUT THE ROOM SIDE CONDENSATE DRAIN. CLEAN OUT SUMP BELOW CONDENSATE HEATER LOCATED ON RIGHT END OF DRAIN PAN.

