

AAF-HermanNelson® Installation Instructions For Floor Mounted Model ARQ, ERQ

Group: **Unit Ventilator**

Part Number: **106100901**

Date: **June 1999**

Figure 1.

IMPORTANT: Operating the water source heat pump system before cleaning the pipe loop can cause series damage to the equipment. Confirm that the system has been cleaned in accordance with the procedure on page 3 before completing the installation of this equipment.

NOTE: These are general instructions. Refer to the AAF-HermanNelson Environmental submittal drawings for specific dimensions, unit arrangement, stub-up locations, etc.

Uncrating and Inspection

Upon receipt of the equipment, check carton for visible damage. Make a notation on the shipper's delivery ticket before signing. If there is any evidence of rough handling, the cartons should be opened at once to check for concealed damage. If any is found, notify the carrier within 48 hours to establish a claim and request their inspection and a report. The Warranty Claim Department should be contacted.

Inspect the carton for any specific tagging numbers indicated by the factory per a request from the installing contractor.

Check the number against the plans to be sure that the unit will be installed in the correct location.

Note: Installation and maintenance must be performed by qualified personnel who are familiar with local codes and regulations, and are experienced with this type of equipment.

Caution: Sharp edges are a potential injury hazard. Avoid contact with them.

Uncrating

1. Check tagging on unit carton to confirm that unit is correct for the location.
2. Position the carton so the end marked "TRUCK FROM THIS END" is on the right-hand side as you face the unit.
3. Carefully remove the carton from the unit. The carton may be retained to provide protection for the unit after installation. Do not remove the protective plastic covering until the unit is to be started. When removing the protective plastic covering, be certain that it is removed from the interior of the front panel.
4. Check for shipping damage.

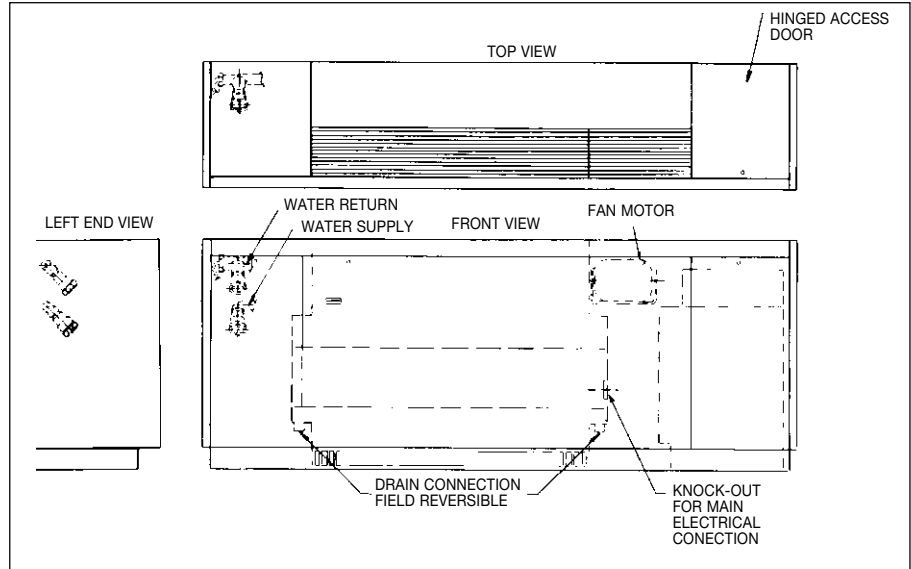
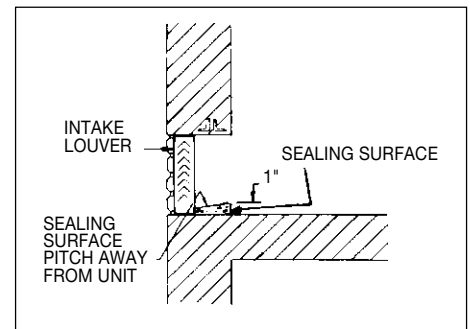


Figure 2.



WALL SURFACE

1. The wall behind the unit should be smooth and plumb.
2. The seals on the rear of the unit will take up the small irregularities of normal masonry construction.
3. Furring strips must be installed on irregular walls or walls with mullions in order to provide a flush surface for the unit to seal against.
4. Any moldings at the floor/wall line should be omitted behind the unit.
5. A sealing surface must be provided at the floor line (see Figure 2).

The above steps are important to prevent leakage of outdoor air which wastes energy, causes erratic control, **AND MAY CAUSE FREEZE-UP OF WATER SYSTEM.**

UNIT WITH DRAFT STOP

6. It is recommended that the unit be installed against a wall made of non-combustible material and on a floor made of non-combustible material.
7. If the mounting surfaces are to be of combustible material, they must be covered with sheet steel. The sheet steel must extend at least 4 feet on either side of the DraftStop opening in the back of the unit and cover completely the exposed wall and floor.

SETTING THE UNIT

1. Be sure that the unit condensate drain hand of connection agrees with the drain stub-up. Move condensate drain plug to opposite end if necessary.
2. Move unit into position against the wall.
3. Check to see that unit is level: front to back and end to end.
4. Attach unit to wall through the four (4) mounting holes provided. (See Figure 3.) AAF-HermanNelson does not provide fasteners. Use fasteners that are suited to the wall construction. Extra length fasteners are required on units with adaptor back.
5. Unit must be pulled tight to the wall so that the outdoor air seals are compressed.

PIPING CONNECTIONS

The system water piping must be thoroughly cleaned and flushed before making the piping connections to the unit. Refer to page 3 for water system cleaning.

1. The water piping to each unit must include a tight shutoff valve in both the supply and return line. A balancing valve must also be installed so that the water flow to the unit can be adjusted to the specified GPM.
2. Always use union type connections. This will permit the piping to be easily disconnected if it becomes necessary to pull the unit from the wall.

3. Units can be hard piped or the optional flexible hose kit can be used. Refer to Figure 5 for guidelines when using the optional hose kit.
4. Connect the unit condensate drain to the building drain system. A trap in the drain line may be necessary to meet local code requirements, but a trap is not required for condensate to flow freely away from the unit.

ELECTRICAL CONNECTIONS

1. All field wiring should be in accordance with the National Electric Code and applicable local codes.
2. Refer to the wiring diagram furnished with the unit to determine electrical connections required.
3. Check unit nameplate to verify that power supply is correct.

OILING

1. Do not attempt to operate the unit fans until the fan shaft bearing has been oiled. (See Figure 3.)
2. Use a high grade SAE 20 or 30 non-detergent oil. A few drops is sufficient. Do not over-oil. Refer to Figure 3 for oil point. The fan motor does not require oiling until after one (1) year of operation.

END PANELS

Install end panels (refer to Figure 4). Attach two (2) Tinnerman nuts to the top edge of the end panel and two (2) to the bottom end of the unit. Align the end panel with the front and top edges of the unit. Attach end panel to unit using four (4) $\frac{5}{32}$ " hex socket head fasteners provided.

SYSTEM BALANCING

1. Do not attempt to operate the unit until it has been determined the proper volume of water is flowing through the unit water coil.
2. Refer to page 4 for recommended water balancing procedure.

Figure 3.

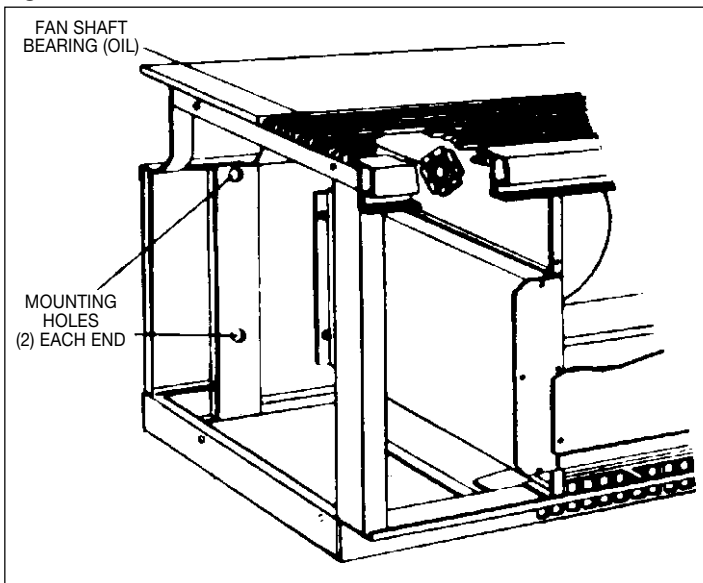
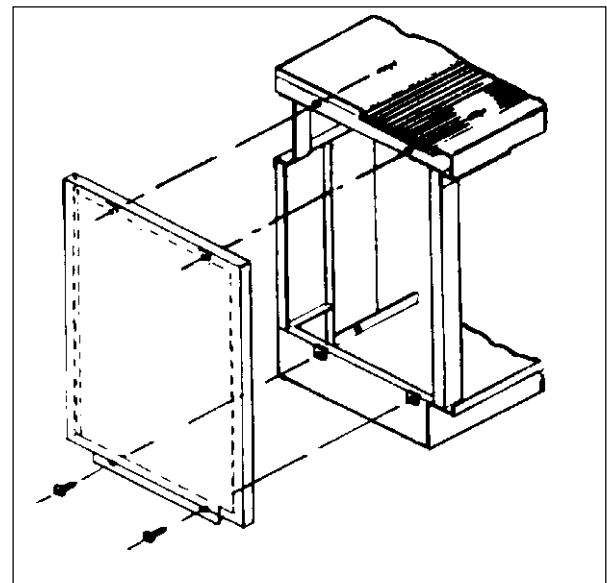


Figure 4.



HOSE ASSEMBLY WITH PIPING THROUGH FLOOR

All hose fittings are brass or zinc plated steel. Assemblies are suitable for 250 PSIG working pressure, 40°F to 120°F water temperature, with a minimum burst pressure of 1000 PSIG. Careful attention must be paid to each individual unit piping design. Water source heat pump systems require careful balancing to insure optimum performance. Check all balancing valves against system head pressure and flows to insure correct sizing. Refer to AR product bulletin for limitations on system water temperatures and recommended water flow.

Parts Supplied By AAF-HermanNelson

- (2) 3/4" Hose Assembly
- (2) Adapter Flare

HOSE ASSEMBLY

In order to avoid damage and premature hose failure, it is very important to comply with the following instructions.

Hose must be installed per Table 1 with gentle radius bends to prevent kinks. Do not twist hose, observing that printing on hose (Lay-Line) is not twisted. Be sure all hose bends meet minimum inside bend radius. See Table 1. Do not overtighten hose. See Table 1.

Table 1.

HOSE I.D.	MIN. INSIDE BEND RADIUS	AFTER HAND ENGAGEMENT, TIGHTEN NO MORE THAN	TORQUE ENGAGEMENT (FEMALE)
			STEEL
3/4"	6"	3 1/2"	945 In-Lbs.

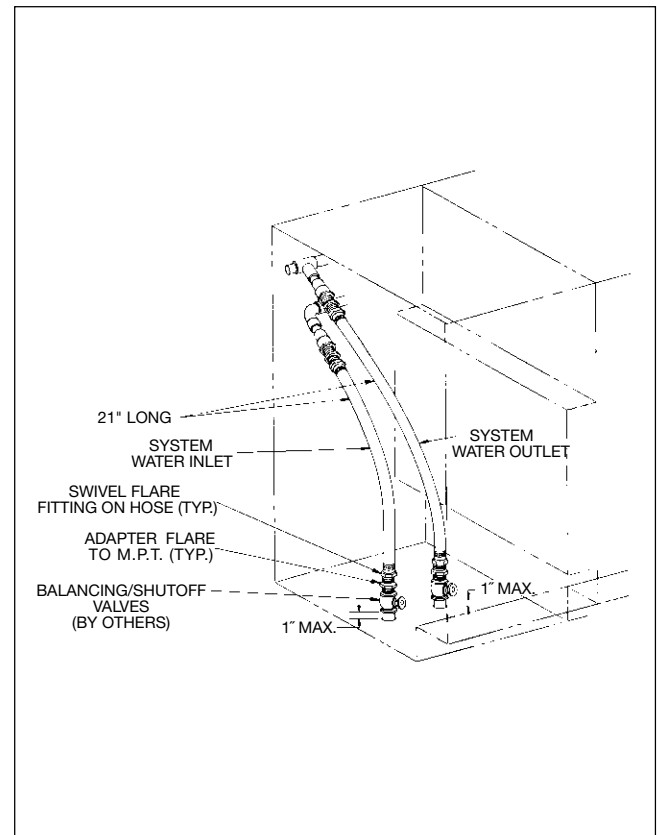
WATER SYSTEM CLEANING

The system water piping must be thoroughly cleaned and flushed in order to remove dirt, chips or other foreign matter before connecting to the heat pumps or starting the system. Since the initial condition of the system water may be such that dirt or other foreign matter may clog or otherwise damage balancing and shutoff valves, it is recommended that these valves be omitted during the cleaning of the water system as outlined in the following procedure.

The entire system should be filled with clean, fresh water and properly vented. Piping leaks should be repaired as early in this procedure as they are discovered. With valves positioned to bypass the heat pumps, heat rejector and the supplementary water heater, the pump should be started to circulate water through the system. Check strainers frequently and clean as often as needed. If the water is extremely dirty or murky, it is sometimes helpful to continuously flush, using the system pump, until the water being flushed out of the pipe loop has become clear. To flush in this manner requires care to be certain that make-up water is being added fast enough to replace what is being flushed out. This can be accomplished by opening the make-up water bypass valve around the automatic pressure reducer valve, adjusting the manual valve so that the pump suction pressure gauge continues to indicate the same positive pressure that existed before the manual drain and make-up valves were opened. Continue for at least two (2) hours.

To complete the cleaning, fill the system with fresh water, adding a cleaning agent such as trisodium phosphate (TSP).

Figure 5. Hose Assembly With Piping Through Floor



Bypass valves at the heat rejector and supplementary water heater should be adjusted for normal operation. Disconnect all power to the heat rejector and heat pump so that they will not operate while the system is being cleaned. The cleaning solution should then be circulated throughout the system, with water heater controls temporarily adjusted to raise the solution temperature to about 105°F to 110°F. DO NOT allow the temperature to rise above 110°F, especially in systems using plastic pipe. Alternate operation of the primary and standby pumps, and circulate the warm solution for several hours. Then turn off the water heater and pump, completely drain the system and refill with fresh water. Repeat the cleaning process only if there is indication of foreign matter still in the system, or if a test of the water indicates that it is even slightly acid.

The water should be slightly alkaline, with a pH no higher than 8.0 and no lower than 7.0, which is neutral. Traces of TSP or similar cleaning agent will tend to leave the water in a slightly alkaline condition provided all acid forming substances such as pipe coatings or flux have been properly cleaned out. A tight system requiring little or no make-up water, with neutral or slightly alkaline water, will remain in proper operating condition indefinitely. The addition of chromates or other corrosion inhibitors is NOT recommended, except when ethylene glycol is added for freeze protection. **IN ALL CASES, A WATER QUALITY EXPERT SHOULD BE RETAINED TO MAKE A WATER ANALYSIS.**

SYSTEM BALANCING

The recommended method, and the one most commonly used, for balancing a system is called "proportionate balancing." Figure 6 shows a water system consisting of reverse return mains feeding three branch mains. Branch A and Branch C are designed as reverse returns, while Branch B is designed as a direct return upfeed riser. Each of the branch circuits has a balancing valve in the line going back to the system return main. In addition, each unit has a balancing valve in its return line. The prescribed method of proportionate balancing is as follows:

1. Open all valves fully.
2. Beginning with Branch A, take readings to determine the GPM flowing to each unit in the branch.
3. Determine the ratio of the actual/design flow for each of the coils in Branch A. This is called the proportionate flow rate. For instance, if Coil A-1 had a design flow rate of 10 GPM and the measured flow rate was 15 GPM, then its proportionate flow rate would be 1.5.
4. Assume Coil A-1 has the lowest proportionate flow rate, A-2 the next lowest, and so on. Leaving the balancing valve to Coil A-1 wide open, begin to throttle the balancing valve on A-2 until the two coils have the same proportionate flow within an allowed tolerance. (This usually is set by the balancing contract at around 5 percent.) Proportionate balance now has been achieved between these two coils.
5. Proceed to Coil A-3 and establish proportionate balance between it and Coil A-2 by the same procedure. Coil A-2

need not be read. It will change in direct proportion to the change in A-2 and will remain in balance with it.

6. Adjust the balancing valve in Coil A-4 until it is in proportionate balance with Coil A-3. Likewise, bring Coil A-5 into proportionate balance with Coil A-4. This is the end of Branch A. All coils on this branch will be proportionately balanced and any increase or decrease in the total system GPM, or the branch, will increase or decrease the GPM at each coil proportionately. They will remain in balance with one another.
7. By the same process, achieve a proportionate balance of all coils on Branches B and C.
8. The next step is to balance the branches. To do this, select at random one coil on each of the three branches. Use the same procedure as for coil balancing and proportionately balance the branches against one another, using the selected coils. Note the balancing valve on the lowest proportionately flowing branch will be left wide open.
9. The final step in the procedure is to adjust the flow from the pump to the system to bring all coils to their design flow rate. As was previously discussed, this can be done by imposing additional resistance at the pump by means of a balancing valve and throttling the system back until the flow rates are equal to those called for by the design, or decreasing the output of the pump by either changing the impeller or changing the pump.

Figure 6.

