Solar Air Heating System

Owner’s Manual: Operation & Maintenance

Contents:

A) System Overview and Function 2
B) System Components 3
C) System Troubleshooting 3
D) Controller Operation 4,5
E) System Guarantee 6
F) Typical System Cost and 6
G) Contact Information 6
Overview of the System

Your Supplemental Solar Air Heating System serves to provide supplemental space heat to your home or building. Essentially, your solar collectors are air-to-air heat exchangers. The collectors (4’ x 6 1/2’, 4’ x 8’, or 4’ x 10’) are mounted on your structure, and when the temperature inside of the collectors gets high enough (approximately 110°F), the fan(s) is activated. When the fan(s) is activated, air is circulated through the collectors, gradually warming the air in your building.

The solar air heat system operation is designed to be fully automatic. There are two system controls: a thermostat and a controller. The system will only be activated if both a) the collectors are warm enough to deliver heat, and b) the thermostat in your house is calling for additional heat. In order to keep the system properly functioning, keep the solar thermostat set higher than your house thermostat.

Basic Solar Air Heat Operation
System Primary Components & General Maintenance

1) **Solar Collectors**
   Solar Air Heat Collectors are air-to-air heat exchangers that are usually mounted vertically on the side of your house. For maximum winter effectiveness, it is necessary to ensure unimpeded exposure to the south. Therefore, shrubs and trees will have to be kept short to promote maximum access to the sun. Cleaning the glass twice per year will help keep your system at its optimum performance. Additionally, once every 5 years check to make certain that the bolts that secure the collectors to the house framing are tight. Caulking should be checked every 5 years as well. CHECK FILTERS OFTEN! The system will not work well with clogged filters, and components can get damaged. Each collector will provide roughly 115,000 Btus per square foot of collector per heating season.

2) **AC Fan(s)**
   1 or 2 fans blow warm air out of the collectors.

3) **Thermostat**
   1 thermostat. It is set higher than primary heating system.

4) **Controller**
   1 thermal differential controller. It has a variety of setpoints which will be discussed on the following page.

5) **Ducting**
   Various lengths of ducting deliver heat to points of need.

6) **Backdraft Damper**
   Prevents reverse thermosiphoning of hot summertime or cold wintertime air.

7) **System Shutoff Switch**
   Emergency shutoff can be achieved by unplugging the controller or the fan.

Troubleshooting Your System

<table>
<thead>
<tr>
<th>Problem</th>
<th>Consider...</th>
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</table>
| Fan isn’t moving.                    | • Is the sun shining? Although your system may operate even in cloudy conditions, your system will work best when the sun is shining, and will not function at all after dark.  
  • Are any of the solar collectors covered by snow or other debris or shading? If so, clear the snow or debris away.  
  • Check your thermostat settings. Your system will not activate if the solar thermostat setting is lower than your conventional heating.  
  • Is the fan operating? If not, please contact your installer. |
| Cold air blowing or fan blowing      | Contact installer.                                                                                                                         |
| constantly.                          |                                                                                                                                          |
| Fan making excessive noise.          | Shut system down and contact installer.                                                                                                |
| No air coming out of outlet.         | Check all air grilles to make certain that they are open. adam.                                                                           |
Warm Air Controller

EAGLE 2 WARM AIR DIFFERENTIAL TEMPERATURE CONTROL
SET POINT INSTRUCTIONS

THE CONTROLLER HAS 4 CONTROLS, which can be viewed by taking the face cover plate off the controller. USE CAUTION WHEN REMOVING FACE PLATE TO AVOID ELECTROCUTION. The controls are:

1. OFF-ON-AUTO SWITCH
2. ON DIF
3. LO LIM
4. THERMOSTAT

1. THE “OFF-ON-AUTO” SWITCH (#1) CAN BE USED TO TEST THE FUNCTION OF THE FAN, ETC. MAKE CERTAIN THAT THE SWITCH IS SET TO “AUTO” PRIOR TO ATTACHING COVER PLATE.

2. IN RESIDENTIAL APPLICATIONS, RECOMMENDED “ON DIF” (#2) SETTING IS 16. FOR COMMERCIAL OR UNHEATED SPACE APPLICATIONS, THE SETTING CAN BE LOWERED TO 8 FOR MAXIMUM HEAT HARVEST. This functions as follows: when the temperature difference between the sensor in the solar collector and the sensor in the building exceeds the dialed temperature difference setting, the fan relay will actuate after a 30-second delay. When the temperature difference decreases 4°F below the set point, the fan will turn off without delay.

3. IN RESIDENTIAL APPLICATIONS, RECOMMENDED “LO LIM” (#3) SETTING IS 90. FOR COMMERCIAL OR UNHEATED SPACE APPLICATIONS, THE SETTING CAN BE LOWERED FOR MAXIMUM HEAT HARVEST. This feature prevents the system from operating the fan when the collector temperatures are too low and could result in cold drafts in the heated space. If the collector sensor temperature is below the LO LIM setting, the controller differential function (#2) will be disabled and the power relay will be kept in the off position. If the collector sensor rises above the LO LIM setting PLUS 10 degrees, the controller will be enabled and return to normal operation.

4. IN RESIDENTIAL APPLICATIONS, RECOMMENDED “THERMOSTAT” (#4) SETTING IS 85 DURING THE HEATING SEASON. WHATEVER THE SETTING, IT MUST BE HIGHER THAN THE BACKUP HEAT THERMOSTAT IN ORDER FOR THE SYSTEM TO FUNCTION PROPERLY. FOR COMMERCIAL OR UNHEATED SPACE APPLICATIONS, THE SETTING CAN BE INCREASED TO MAXIMUM, 105, FOR INCREASED HEAT HARVEST. When the building temperature rises 3 degrees above the THERMOSTAT setting, the fan will turn off without delay. When the space temperature decreases below the THERMOSTAT setting, the controller will check to see if there is heat in the collector. If the collector is hot enough, the fan will turn on.
Warm Air Controller

COL=COLLECTOR (TEMP)
HSE=HOUSE (TEMP)
DIF=DIFFERENTIAL (TEMP)
CLL=COLLECTOR LOW LIMIT (TEMP)
PKH=PEAK HIGH (TEMP)
PKL=PEAK LOW (TEMP)
SLL=SYSTEM LOW LIMIT (OFF/ON)
TST=THERMOSTAT (TEMP)
AX1=AUX SENSOR (TEMP)
System Guarantee

8th Fire Solar has a limited warranty on our air heat collectors for a period of 10 years from the date of receipt. This Limited Warranty is void if failure of the Air Heat Collector has resulted from accident, abuse, or misapplication. The Limited Warranty applies if installed by a trained solar professional. All other components and workpersonship are warranted for one year from the date of installation. (See Limited Warranty for more details.)

Generic System Installation Cost

The following is approximately what your system cost 8th Fire Solar to install.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor</td>
<td>$1000</td>
</tr>
<tr>
<td>Solar Collectors</td>
<td>$3600 (2 collectors)</td>
</tr>
<tr>
<td>Fan</td>
<td>$200</td>
</tr>
<tr>
<td>Misc Ducting, etc</td>
<td>$1000</td>
</tr>
<tr>
<td>Misc Electrical</td>
<td>$400</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$6200</strong></td>
</tr>
</tbody>
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About 8th Fire Solar

At 8th Fire Solar, we are building a better future for our Native American communities by creating and assembling a sustainable and renewable energy product: solar thermal panels.

Our manufacturing facility near Pine Point creates and provides high-quality, efficient renewable energy technology for heating homes and small businesses throughout the continent.

For more than 10 years, we’ve worked on solar installations on the White Earth, Leech Lake, & Bois Forte reservations in northern Minnesota.

Contact Us

Don’t hesitate to contact us if you have any questions about your system. We want it to work for you!!!

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