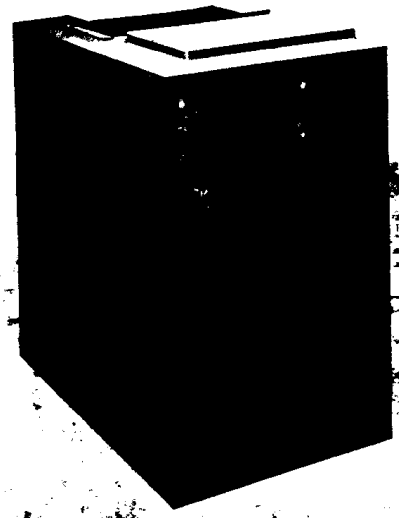
SOLAR AIR MOVER

CUSTOMER SERVICE MANUAL

Model # 10A

Serial # 1941-0385-0123



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I. TRANSPORTATION

All SAM units are packaged in approved shipping containers. Terms of sale are F.O.B. point of shipment and title passes to the consignee at the time of shipment upon signature of the carrier agent.

Note: Shipment damage is your responsibility!

All units should be carefully inspected upon arrival and claims for damage should be filed against the carrier. In the event of damage the consignee should:

1. Note all damage on the delivery receipt.
2. Notify carrier immediately and request an inspection.
3. If damage is concealed notify as soon as possible.
4. File a claim against the carrier, with supporting documents:

   Bill of Lading
   Paid freight bill
   Invoice
   Inspection report

II. LIMITED WARRANTY

Solar Control Corporation warrants the equipment of its manufacture to be free from defects in material and/or workmanship under normal use and service. This obligation under this warranty is limited to making good any part or parts thereof, which 1) upon examinations at SCC shall be disclosed to be defective, and which 2) shall be returned to SCC, transportation charges prepaid, within one year after delivery to the original purchaser. This warranty shall not apply to any equipment which shall have been repaired or altered outside of Solar Control Corporation in any way so as to affect its use, function, or reliability, or which shall have been subject to misuse, alteration, improper installation, negligence or accident. In no event shall SCC be liable for damage of any kind connected with the use of the equipment or its failure to function properly.

III. SAM INSTALLATION

A. GENERAL PRACTICES

The SAM is typically installed in conditioned space (usually a basement) and must be placed in an upright position.

Two access panels are provided on each side of the SAM. Be sure that adequate space is left around the SAM for ease of maintenance, to the controller and through the access panels.

Improper sizing of ducts is one of the major faults in solar systems, Good ducting practices must be used! If air flow through the collector is lower than the collector manufacturer specifies, the air entering the SAM will have a high temperature which could cause the motor to reach thermal overload. The motor will shut off until it cools sufficiently to start again. It is recommended that the air temperature into the SAM be limited to 160°F.

It is recommended that small sections of flexible ducting be used for connecting to the SAM. This allows ease of maintenance and reduces potential noise transmission.

Use extreme care in connecting the controller!

1. Remove AC power from the SAM before connecting the controller, or making changes to controller connections.
2. Carefully evaluate the auxiliary heating circuit to determine the proper SAM controller connections.
3. Check with local codes and engage a competent electrician to connect the SAM.
4. The following procedure can be used to insure proper controller protection upon initial hook up.

   A. Connect a 1 amp fuse between the red lead on the back of the controller and the 24 VAC transformer.
   B. If the R to R connection is used (this is discussed later) connect a 1 amp fuse between R & R instead of just a wire.
   C. After the hook up is verified the fuses should be removed.

B. AIR FLOW

The SAM units are designed for the air flows shown in Figure (3A). A detailed system design is critical, as improper air flows will not give satisfactory results. A common design error in solar systems is the under-estimation of system static pressure.

Figure (3A)

MODEL	STATIC PRESSURE .5"	.75"	1.0"	1.25"	1.5"	2.0"
10A	1300/450	1100/400	1000/350	700/250		
20A	1800/600	1600/550	1400/500	1100/400	500/150	
30A	3000	2200	2000	1800	1500	800

* Underlined values indicate preferred operating range.
* The SAM 10A & SAM 20A have two-speed motors.

6 CFM per Rod 6 x 48 = 288

C. HOT WATER COIL

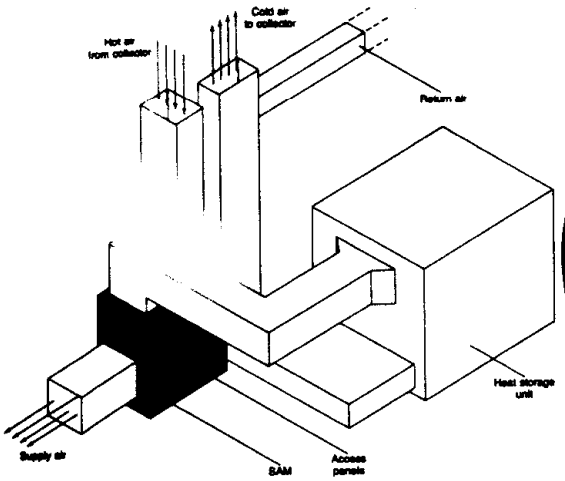
The optionel hot water coil is installed within the storage inlet/outlet. Holes are drilled in the access panel to accommodate the water inlet and outlet pipes.

For summer operation it is recommended that a bypass damper be placed in the storage ducting to exhaust the air to the outside, bypassing storage.

D. SAM PICTORIALS

Figure (3B) illustrates the duct connections to & SAM unit.

FIGURE (3B) - PICTORAL SAM DUCTING



The SAM and the auxiliary heater can be installed either in series or in parallel.

Figure (3C) illustrates installation alternatives. Typically the parallel installation would be the recommended type, unless a duct heater is used that does not have a fan.

FIGURE (3C) - SERIES vs. PARALLEL CONNECTION

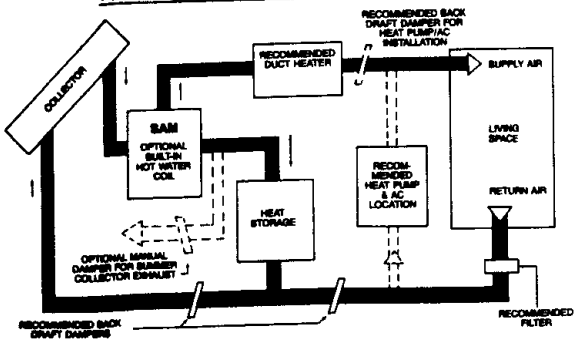
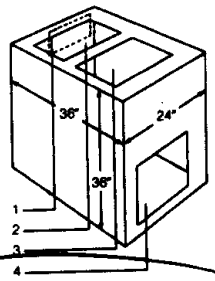


Figure (3D) shows the physical size of the SAM and the duct sizes.

FIGURE (3D) - DUCT SPECIFICATIONS

1. SAM control unit.
2. Inlet duct from collector - 19" x 12".
3. Inlet/outlet duct to storage - 19"x 12".
4. Outlet to home - 19" x 15".



E. TWO SPEED MOTOR OPERATION

The SAM 10A and SAM 20A have two-speed motors; however they are factory wired for only high speed operation. Both the SAM 10A and 20A can be field wired so that the low speed is available for the collection-to-storage mode, while the high speed is used for all other modes. For this option, the wire that runs from pin 1 of relay 2 to pin 4 of relay 3 is moved from pin 4 of relay 3 to the low speed blower connection. (Refer to the SAM wiring diagrams section of this manual.)

IV. PROBE PLACEMENT

PROBE #1 (COLLECTOR PROBE)

Usually located near the top of the collector, in contact with the collector plate, such that it closely reflects the collector temperature.

PROBE #2 (HOT STORAGE PROBE)

Usually located in the top 6 inches, the hottest area, of storage. Installation in a horizontal copper pipe facilitates installation and removal.

PROBE #3 (COLD STORAGE PROBE)

Usually located in the bottom 6 inches, the coldest area, of the storage. Installation in a horizontal copper pipe facilitates installation and removal.

V. CONTROLLER LOGIC

A. COLLECTOR TO STORAGE

1. Summer/winter switch in winter position: The SAM is inactive until the collector temperature is 45°F greater than cold storage temperature. Then, collected heat will be directed to storage, also heating hot water if the optional Hot Water Coil is installed. Collection will continue until the collector and storage temperature is ≤ 25°F.

   These temperature differentials can be lowered as discussed in the controller connection section of this manual. (Page 6.)

2. Summer/winter switch in summer position: The sole purpose of the summer position is to allow for the heating of domestic hot water. There are two major differences with the switch in the summer position:
   a. Collection will not start until the collector temperature is approximately 140°F and will stop when the collector temperature is approximately 115°F. This will vary somewhat with storage temperature.
   b. Collection will not take place if the hot water limit switch is satisfied (open).

B. THERMOSTAT REQUESTING HEAT

Thermostat signals are directed to the SAM controller and the appropriate response is initiated.

It is necessary to use a two stage thermostat. Without two stages, the SAM could be delivering solar heat but not realize that the home was becomming colder and that auxiliary heat should be activated.

1. Thermostat requesting stage 1 (W_1) heat.

   a. If the system is currently in the collection-to-storage mode then warm air from the collectors will be delivered directly to the home.

   b. If the collector cannot deliver heat, hot storage will be checked to see if its temperature is greater than PDT (programmed delivery temperature). If hot storage temperature is greater than PDT, storage heat will be delivered to the home. (The SAM controller is factory wired for a PDT of 85°F.)

   c. If neither the collector nor the storage can deliver heat, the controller will turn on the auxiliary heating unit (W_1 output on the controller).

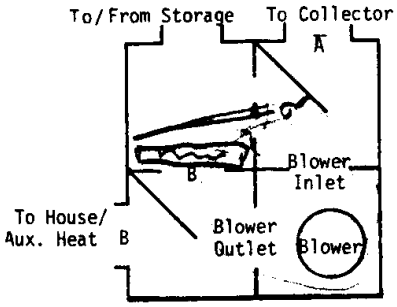
2. Thermostat requesting stage 2 (W_2) heat.

   This condition usually means that solar heat has been unable to keep up with the home heating demands. The SAM controller will turn on the auxiliary furnace to supply additional heated air until the home temperature requirement (W_1) is satisfied. The installer can program the SAM blower either to shut off or to continue operation during the delivery of auxiliary heat. This will be discussed in the controller logic section of this manual under parallel operation. (See paragraph E. page 5.)

C. DAMPER OPERATION

The following figure (5A) shows the SAM damper operation:

FIGURE (5A) - SAM DAMPER OPERATION



A = Normal Position

B = Normal Position

$\overline{A}$ = Powered Position

$\overline{B}$ = Powered Position

The following damper positions would be seen:

1. No 110 VAC power to SAM.	A and B
2. 110 VAC power to SAM.	$\overline{A}$ and B
3. Collection to storage.	A and $\overline{B}$
4. Collection to home.	$\overline{A}$ and $\overline{B}$
5. Storage to home.	$\overline{A}$ and $\overline{B}$

D. CONTROLLER LOGIC DIAGRAM

Refer to the following figure (5B) for a total summarization of the SAM operation with various thermostat and probe inputs.

FIGURE (5B) - CONTROLLER LOGIC CHART

	INPUT	SAM BLOWER	DAMPERS	AUXILIARY
1.	--	Off	$\overline{A}$, B	--
2.	T_1	On	A, B	P
3.	T_1, W_1	On	A, $\overline{B}$	P
4.	T_1, W_1, W_2	On	A, $\overline{B}$**	P,W_1,W_2,G*
5.	T_2, W_1	On	$\overline{A}$, $\overline{B}$	--
6.	T_2, W_1, W_2	On***	$\overline{A}$, $\overline{B}$**	W_1, W_2, G*
7.	W_1	On***	$\overline{A}$, $\overline{B}$**	W_1, G*
8.	W_1, W_2	On***	$\overline{A}$, $\overline{B}$**	W_1, W_2, G*
9.	T_3	On	A, B	P

T_1 = $T_{COL} \geq (T_{S-L} + 45^oF)$

T_2 = $T_{S-HI} \geq 85^oF$

T_3 = $T_{COL} \geq 140^oF$ with S/W switch in summer mode and limit switch closed

W_1 = First stage heat request and/or output

W_2 = Second stage heat request and/or output

P = DHW pump

G = Fan output on controller

* = Off when UP2 open (see paragraph F)

** = B when UP1 open (see paragraph E)

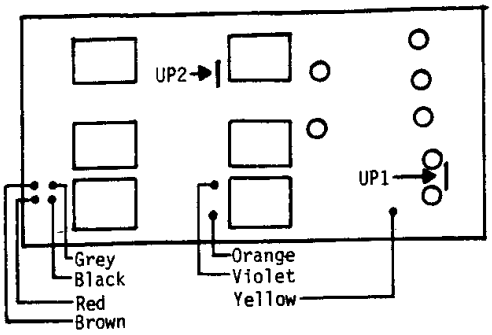
*** = Off when UP1 open (parallel connection)

Auxiliary = 24 VAC output available between designated terminal and common

E. PARALLEL CONNECTION

When your auxiliary heating system is connected in parallel (rather than in series) with the SAM, it is usually desirable to turn off the SAM blower and shut the damper to the home when auxiliary heat is turned on. This is accomplished by clipping shorting bar UP1 on the back of controller. Refer to the following diagram figure (5C) for the location of shorting bar UP1.

FIGURE (5C) - CIRCUIT BOARD: UP1 & UP2



F. FAN OFF OPTION

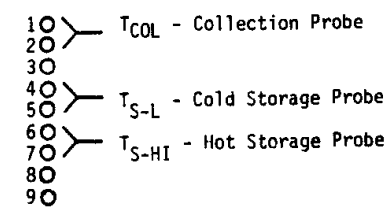
It is possible to prevent the fan voltage from appearing at the auxiliary G terminal (between terminal pins 14 & 15) except for the "fan on" condition from the thermostat. Shorting bar UP2 is clipped in the back of the controller. Refer to figure (5C).

VI. CONTROLLER CONNECTIONS

A. PROBE CONNECTIONS

The probes connect to the terminals on the left side of the controller as shown below. Figure (6A) shows a typical probe connection diagram.

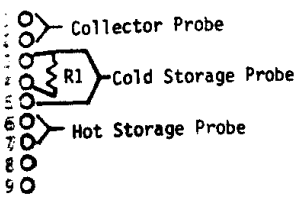
FIGURE (6A) TYPICAL PROBE CONNECTION



The controller is factory wired for a differential offset of 45°F on and 25°F off. This means that the collector temperature must be 45°F hotter than the cold storage temperature before collection will start, and must drop to 25°F hotter than cold storage temperature before collection will stop. These differentials can be changed in the field by following these instructions and referring to figure (6B).

1. Instead of connecting the cold storage probe to terminals 4 & 5, connect the probe to terminals 3 & 5.
2. Connect a resistor (R1) between terminals 3 & 4. The resistance value is chosen from the table in figure (6B).

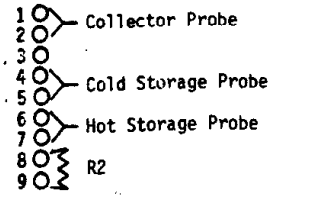
FIGURE (6B) - CHANGING DIFFERENTIAL OFFSETS



DIFF. ON °F	DIFF. OFF °F	RESISTOR (R1) ohms
40	20	4,700
35	15	10,000
30	10	16,000
25	5	24,000

The [illegible]oller is factory [illegible]ired for a PDT (progra[illegible] delivery [illegible]ature) of 85°F. This mean[illegible]hat the c[illegible]er will not indicate tha[illegible] solar hea[illegible]lable from storage unless the [illegible] temperature is equal to or grea[illegible] than [illegible]°F. This temperature (PDT) can [illegible] changed by connecting a resistor R_2 to terminals 8 and 9. See figure (6C) for the connection and the resistance value to use.

FIGURE (6C) - CHANGING PDT



PDT °F	Resistor (R_2) ohms
85	None
90	200,000
100	60,400
110	32,400
120	21,000
130	14,700

B. AUXILIARY CONNECTIONS

The auxiliary units are connected to the middle row of terminals on the controller. Refer to figure (6D).

D. CONTROLLER LOGIC DIAGRAM

Refer to the following figure (5B) for a total summarization of the SAM operation with various thermostat and probe inputs.

FIGURE (5B) - CONTROLLER LOGIC CHART

	INPUT	SAM BLOWER	DAMPERS	AUXILIARY
1.	--	Off	$\overline{A}$, B	--
2.	T_1	On	A, B	P
3.	T_1, W_1	On	A, $\overline{B}$	P
4.	T_1, W_1, W_2	On	A, $\overline{B}$**	P, W_1, W_2, G*
5.	T_2, W_1	On	$\overline{A}$, $\overline{B}$	--
6.	T_2, W_1, W_2	On***	$\overline{A}$, $\overline{B}$**	W_1, W_2, G*
7.	W_1	On***	$\overline{A}$, $\overline{B}$**	W_1, G*
8.	W_1, W_2	On***	$\overline{A}$, $\overline{B}$**	W_1, W_2, G*
9.	T_3	On	A, B	P

T_1 = T_{COL} ≥ (T [illegible] + 45°F)

T_2 = T_{S-H}

T_3 = T_{CO} [illegible] with S/W switch in summer [illegible]it switch closed

W_1 = [illegible]age heat request and/or output

W_2 = [illegible] stage heat request and/or output

P = [illegible] pump

G = Fan output on controller

* = Off when UP2 open (see paragraph F)

** = B when UP1 open (see paragraph E)

*** = Off when UP1 open (parallel connection)

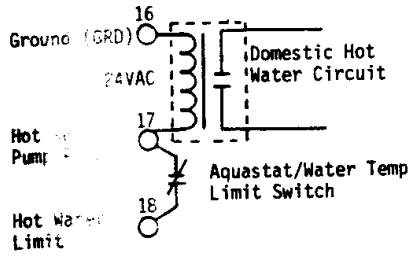
Auxiliary = 24 VAC output available between designated terminal and common

E. PARALLEL CONNECTION

When your auxiliary heating system is connected in parallel (rather than in series) with the SAM, it is usually desirable to turn off the SAM blower and shut the damper to the home when auxiliary heat is turned on. This is accomplished by clipping shorting bar UP1 on the back of controller. Refer to the following diagram figure (5C) for the location of shorting bar UP1.

FIGURE (6F)

DOMESTIC HOT WATER PUMP CONNECTION



C. THERMOSTAT CONNECTIONS

The thermostat wires are typically connected to terminals 19 - 23, although the connection diagrams may show a few variations. These terminals are clearly marked on the controller.

D. STATUS

The [illegible] are 24 VAC signals (max ½ amp) that are available between terminal 14 - 27 and ground. These outputs are clearly marked on the controller. These outputs are used to operate the indicator lights in the Solar Sentry.

Solar Collection (winter) (Terminals 15 & 24)
24 volts will be available between pin 24 and pin 15 when the collector is delivering heat to either the home or storage.

Solar Distribution (Terminals 15 & 25)
24 volts will become available between pin 25 and 15 when the home is being heated from stored solar heat.

Auxiliary Furnace (Terminals 15 & 26)
24 volts will become available between pin 26 and pin 15 upon activation of stage 1 of auxiliary heat.

Solar Collection (summer) (Terminals 15 & 27)
24 volts will become available between pin 27 and pin 15 when the summer/winter switch is in either position and domestic hot water is being heated by solar heat.

VII. INSTALLATION CHECKOUT

Refer to figure (7A) for terminal reference numbers.

A. Check the SAM unit completely: screws, fan belt, motor mounting, terminal strip connections, etc., to insure that vibration in shipment has not caused movement or loosening of parts.

B. Short across terminals 4 and 5 (T_{S-L}). This will simulate a hot condition at cold storage (probe #3), and will insure that collection will not start.

C. Short from terminal 13 (R) to terminal 22 (return). 24 VAC is now available to the auxiliary.

D. Put the summer/winter switch in the winter position.

E. Connect 110 VAC to the SAM unit. The collector damper will close.

F. Perform a collector-to-storage mode test.

1. Short across terminals 1 & 2 (T_{COL}). This simulates a high collector temperature.
2. Remove the short from terminals 4 & 5 (T_{S-L}).
3. The following actions should occur:
   a. The collector damper will open.
   b. The home damper will remain closed.
   c. The SAM blower motor will turn on.
   d. Air will flow from collector to storage.
4. Leave these conditions for the next test.

G. Perform a collector-to-house mode test.

1. Short across terminals 19 & 22 (W_1 & $R_H R_C$). This simulates a request for stage 1 heat from the thermostat.
2. The following actions should take place:
   a. The collector damper will remain open.
   b. The home damper will open.
   c. The SAM blower motor will turn on after a time delay of approximately 15 seconds. This time delay occurs on all heating requests.
   d. Air will flow from collector to home.
   e. There will be no voltage between pins 16 & 10 (G_{RD} & W_1).
   f. Leave these conditions for the next test.

H. Perform a storage-to-home mode test.

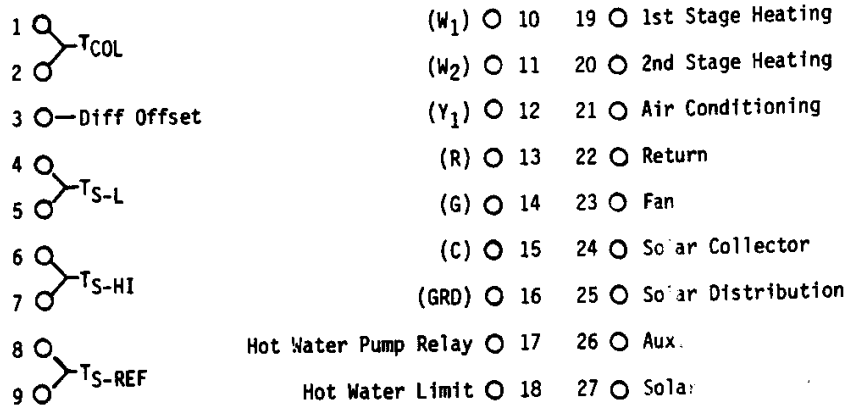
1. Remove the short from terminals 1 & 2.
2. Short across terminals 4 & 5 (T_{S-L}).
3. Retain the short on terminals 19 & 22 (W_1 & R_HR_C).
4. Short across terminals 6 & 7 (T_{S-HI}). This simulates a hot condition at hot storage.
5. The following actions should take place.
   a. The collector damper will stay closed.
   b. The home damper will open.
   c. The SAM blower will turn on.
   d. Air will flow from storage to home.
   e. There will be no voltage between pins 16 & 10 (G_{RD} & W_1).
6. Leave these conditions for the next test.

I. Perform a storage-to-home mode test with auxiliary.

1. Short terminals 20 & 22 (second stage heating & R_HR_C). This simulates a request from the thermostat for stage 2 heat.
2. All the actions of the previous test except 5e will occur. In addition, there will be 24 VAC between terminals 16 & 10 (G_{RD} & W_1), and also 24 VAC between terminals 16 & 11 (G_{RD} & W_2).

FIGURE (7A)

TERMINAL REFERENCE CHART



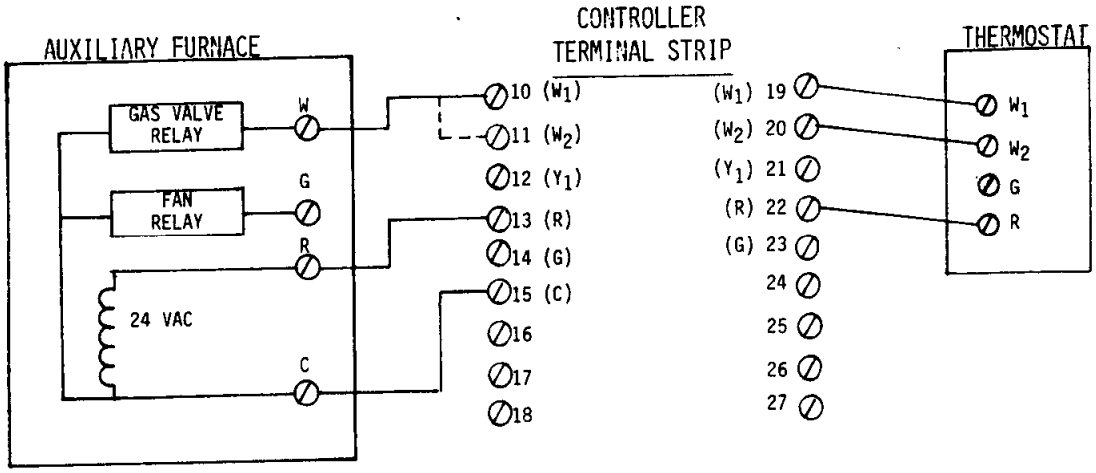
VIII. TYPICAL AUXILIARY CONNECTIONS

A. GAS FIRED FURNACE

The Gas valve relay "W" can be connected to either pin 10 (W_1) or pin 11 (W_2). If a two stage thermostat is used and the connection is made to pin 11 (W_2), and there is no solar availability, the gas valve will not be energized until the thermostat requests stage two heat.

If the Solar Control three stage thermostat is used the gas valve should always be connected to stage two so advantage can be taken of the economy heat position.

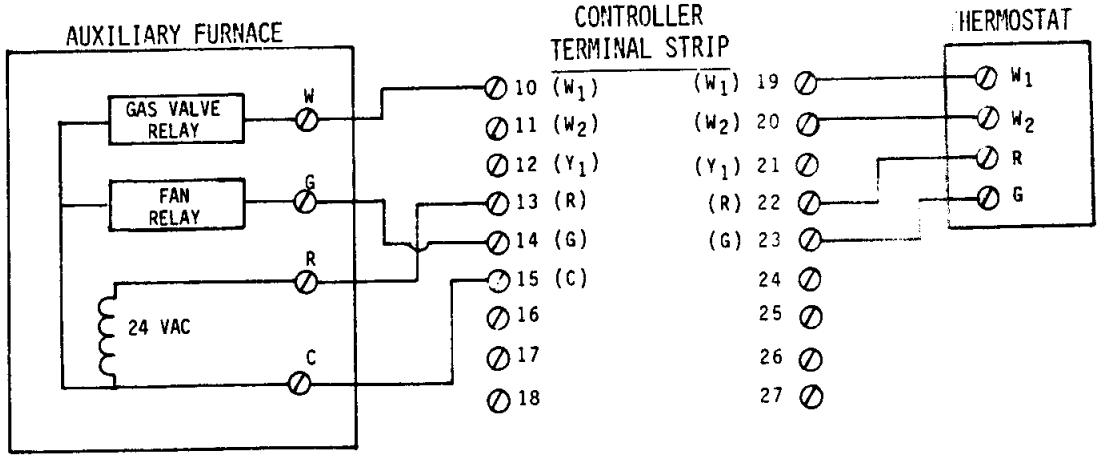
FIGURE (8A)



B. GAS FIRED FURNACE - CONTINUOUS AIR MODE

Use figure (8B) if continuous air mode is desired.

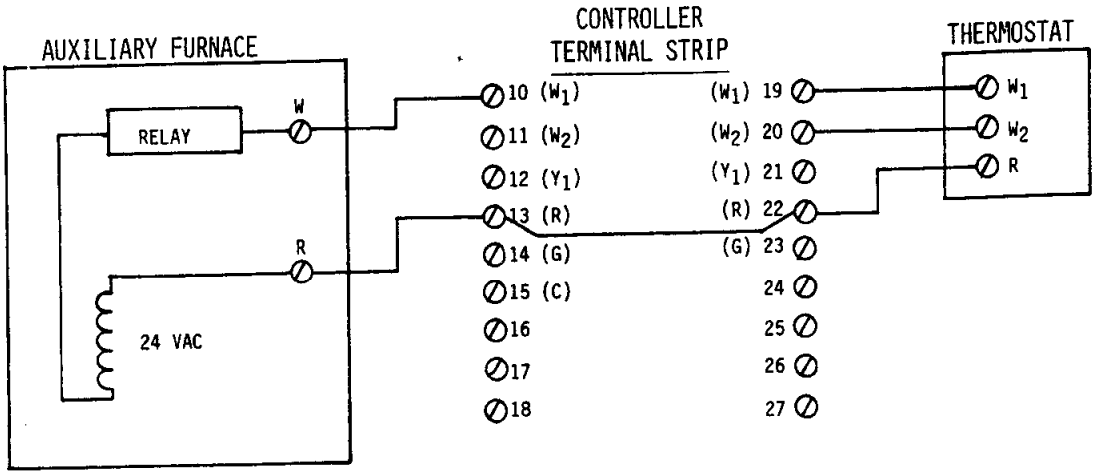
FIGURE (8B)



C. FURNACE WITHOUT TERMINAL "C" AVAILABILITY

In some furnaces, the 24 VAC from the furnace cannot be brought into the controller, as the "C" terminal is not accessible. In such an instance, use following connection. Note that pin 13 (R) 's connected to pin 22 (R).

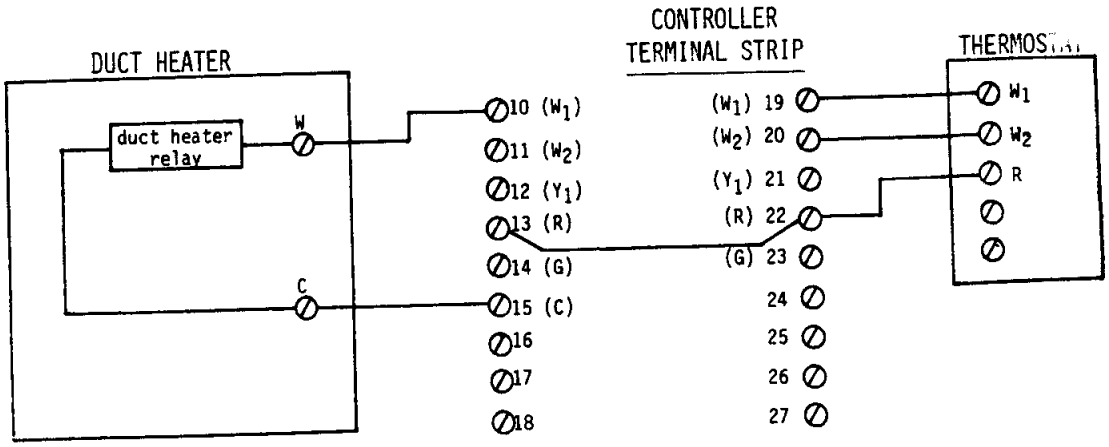
FIGURE (8C)



D. DUCT HEATER CONNECTION (SINGLE STAGE)

This connection is used if the auxiliary heater does not have its own 24 VAC transformer. Note that pin 13 (R) is connected to pin 22 (R). For duct heaters with internal tr ers, select the appropriate connection from A, B or C above. If the duct heater has two s figure (8E). The maximum output is 3/4 ampere.

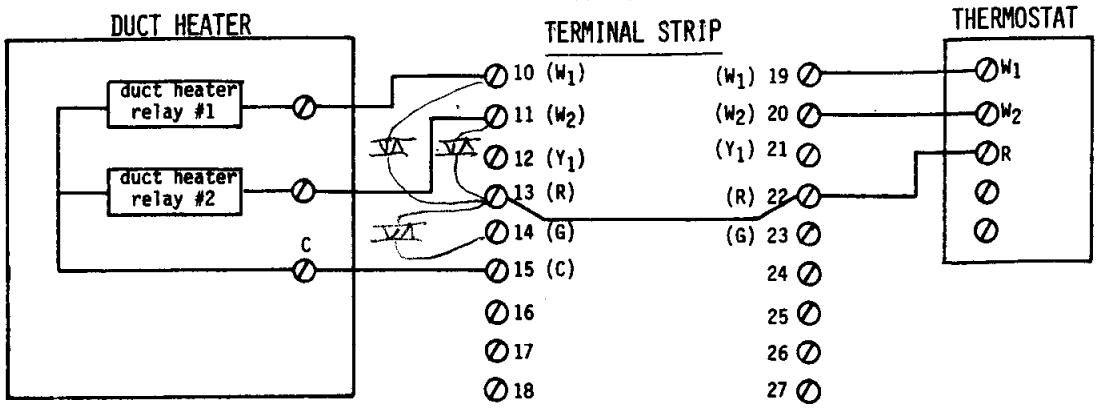
FIGURE (8D)



E. DUCT HEATER CONNECTION (TWO STAGE)

Use if the duct heater has two stages to be activated separately, and has no internal transformer. The maximum total output should be limited to 1 ampere.

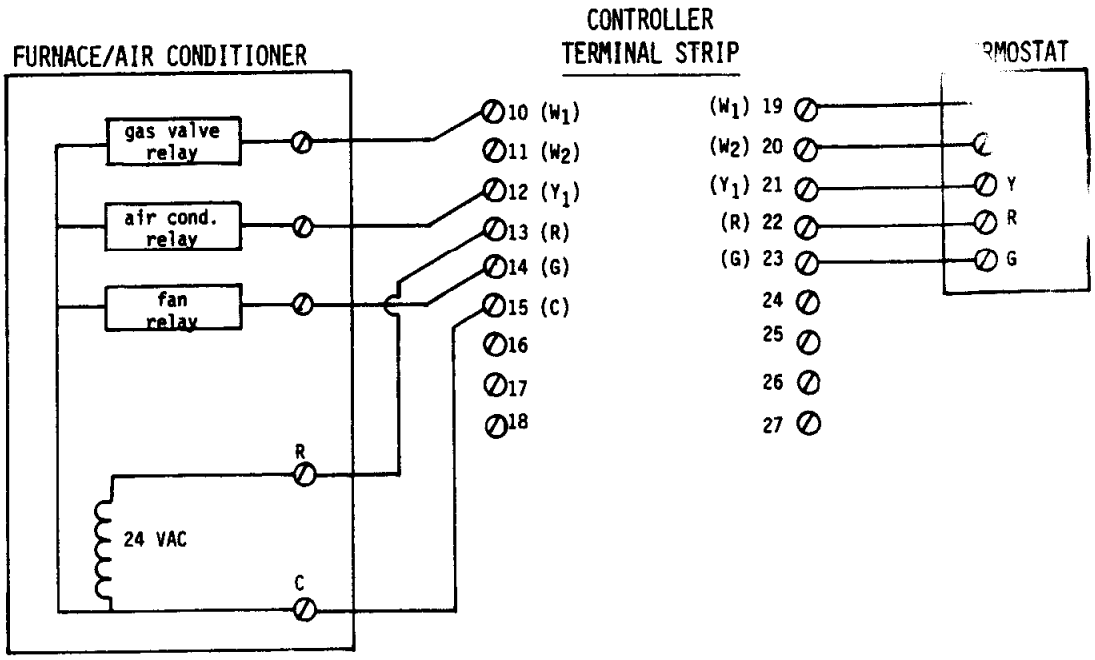
FIGURE (8E)



F. FURNACE/AIR CONDITIONER (COMMON TRANSFORMER)

Use if the furnace has the air conditioner relay built in, and there is a single transformer for both the furnace and the air conditioner.

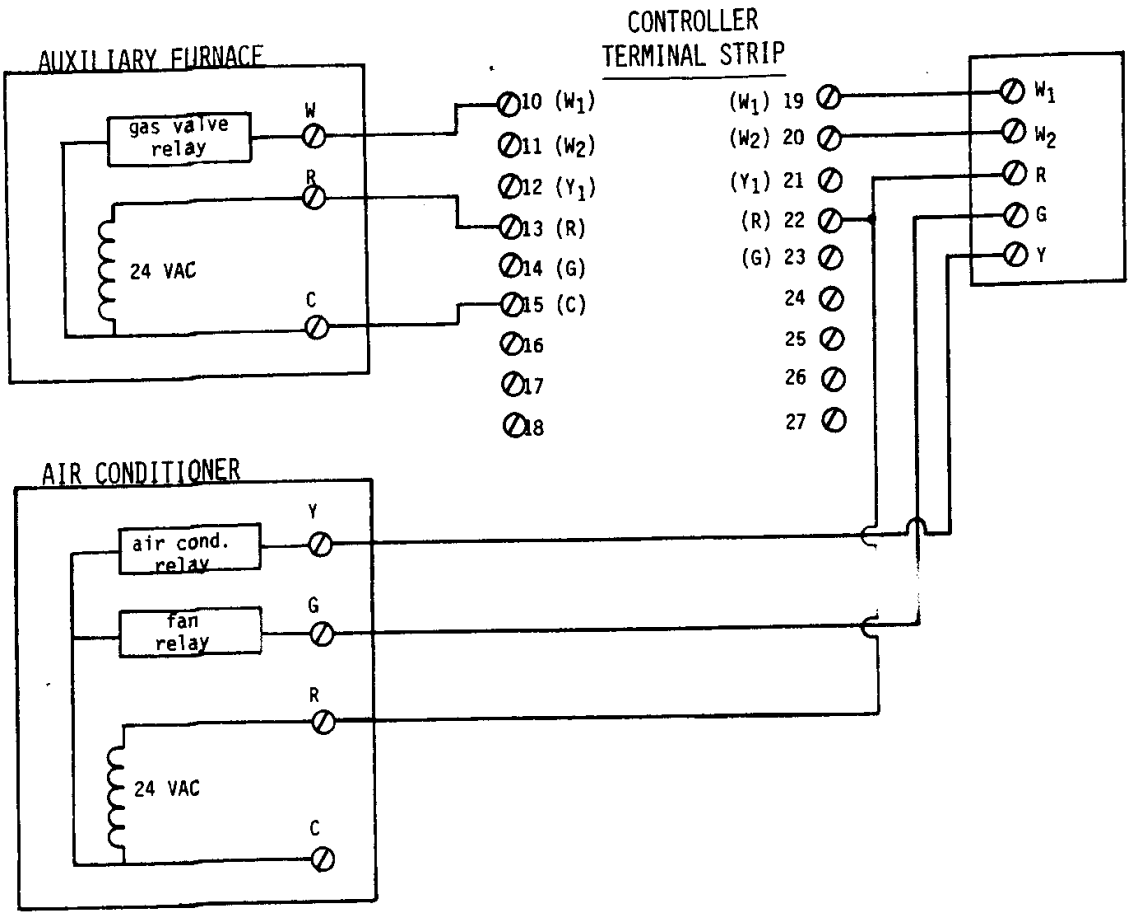
FIGURE (8F)



G. FURNACE AND SEPARATE AIR CONDITIONER

Use the following connection diagram if the furnace is separate from the air conditioner and each has its own transformer.

FIGURE (8G)

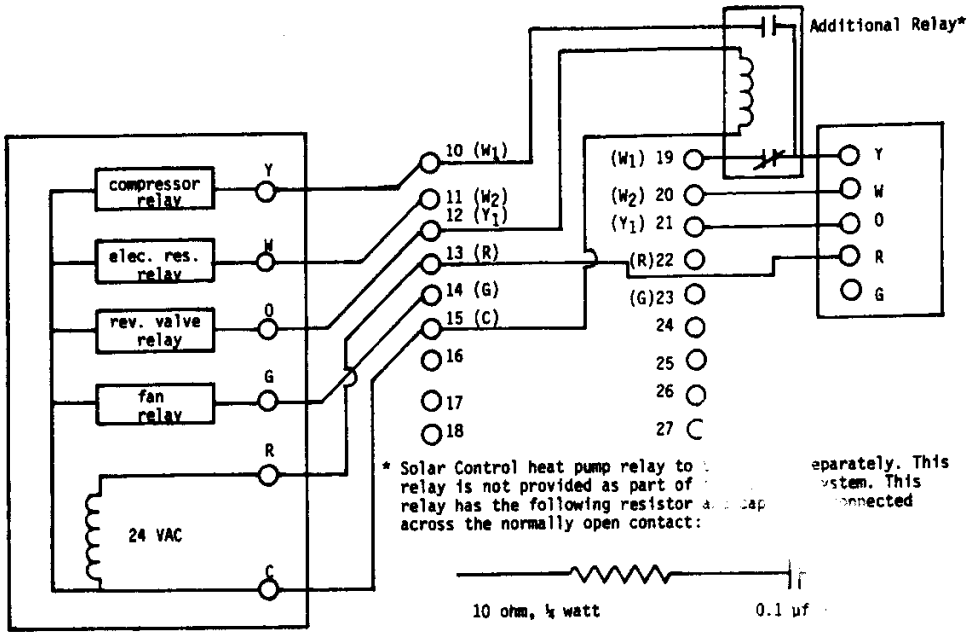


H. HEAT PUMP CONNECTION

Following is one method for connecting a heat pump. Evaluate your particular heat pump for the validity of this connection diagram. This diagram should only be used when connecting the heat pump in parallel with the SAM. This means shorting bar UP1 is cut in the controller. (See paragraph E, figure 5C.) The SAM can be used to heat domestic hot water simultaneously with air conditioning. This can be done with the summer/winter switch in either position. Note: The thermostat R is connected to pin 13 (R), not to pin 22 (R). It is assumed that the heat pump thermostat automatically requests Y (compressor) and G (fan) simultaneously.

The following input/output logic applies to this heat pump connection:

FIGURE (8H)



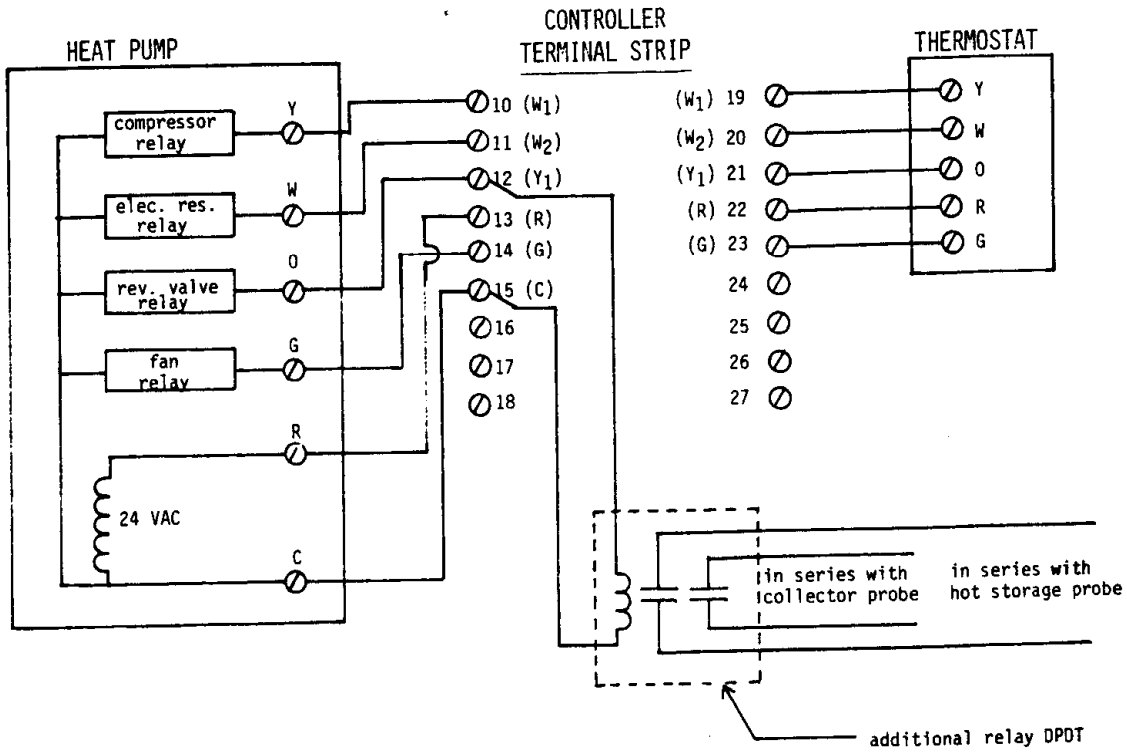
Input Thermostat Request	Solar Available	Output
Y & G	No	Y,G
	Yes (SC)	SC,SD
	Yes (SD)	SD
Y & G & W	No	Y,G,W
	Yes (SC)	SC Y,G,W
	Yes (SD)	Y,G,W
Y & G & O	No	Y,G,O
	Yes (SC)	SC Y,G,O
	Yes (SD)	Y,G,O

Y = compressor, W = 2nd stage-resistance heat, G = fan, O = reversing valve, SC = solar collection, SD = solar distribution

I. HEAT PUMP CONNECTION

The following connection diagram can be used for either a series or parallel heat pump configuration. However, domestic hot water can not be heated from the collector when the heat pump is in an air conditioning mode. It is assumed that the heat pump thermostat you are using automatically requests G (fan) when Y (compressor) is requested. One relay contact is used in series with one of the collector probe leads and the other contact in series with one of the hot storage probe leads. The input/output logic follows:

FIGURE (8I)



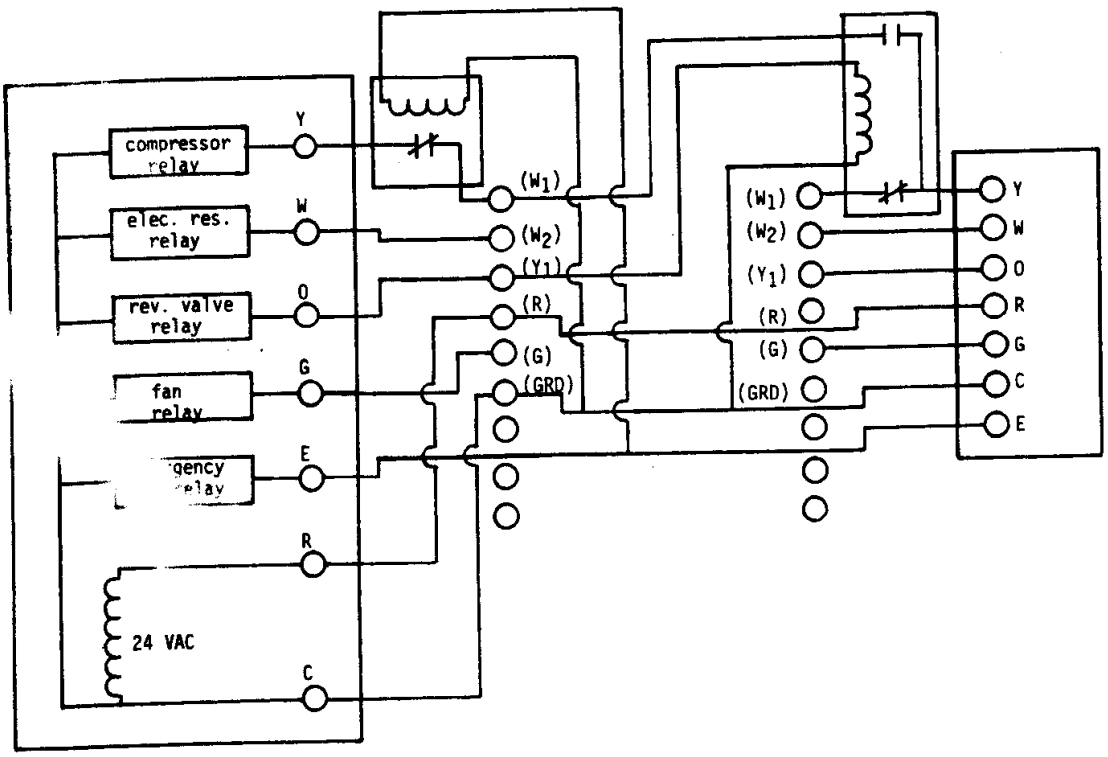
Input Thermostat Request	Solar Heat Available?	Output: Series	Output: Parallel
Y & G	No	SD, Y, G	Y, G
	Yes (SC)	SC, SD	SC, SD
	Yes (SD)	SD	SD
Y & G & W	No	SD, Y, G, W	
	Yes (SC)	SC, SD, Y, G, W	SC Y, G, W
	Yes (SD)	SD, Y, G, W	Y, G, W
Y & G & O	No	SD, Y, G, O	Y, G, O
	Yes (SC)	SD, Y, G, O	Y, G, O
	Yes (SD)	SD, Y, G, O	Y, G, O

SD = solar distribution, SC = solar collection

J. HEAT PUMP CONNECTION (WITH EMERGENCY HEAT RELAY)

The following diagram can be used when the heat pump has an emergency heat relay. An additional relay is used to disable the compressor when emergency heat is requested.

FIGURE (8J)

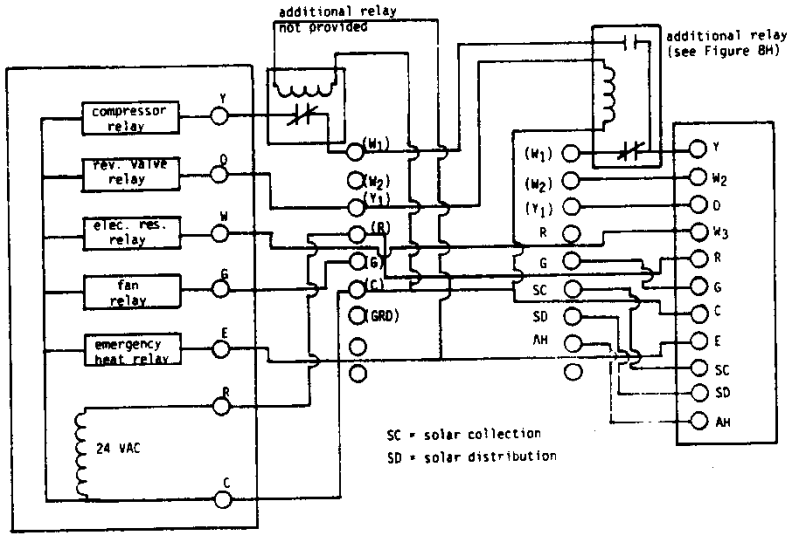


Input Thermostat Request	Solar Availability	Output	
Y, G	No		G, Y
	Yes (SC)	SC, SD	
	Yes (SD)	SD	
Y, G, W	No		G, Y, W_2
	Yes (SC)	SC	G, Y, W_2
	Yes (SD)		G, Y, W_2
Y, G, O	No		G, Y, O
	Yes (SC)	SC	G, Y, O
	Yes (SD)		G, Y, O
Y, G, E	No		G, E
	Yes (SC)	SC	G, E
	Yes (SD)		G, E
Y, G, W, E	No		G, W_2, E
	Yes (SC)	SC	G, W_2, E
	Yes (SD)		G, W_2, E

K. HEAT PUMP DIAGRAM (USING SOLAR CONTROL THERMOSTAT)

The following diagram can be used with the Solar Control heat pump thermostat. Refer to the following logic diagram to insure the logic meets the requirements.

FIGURE (8K)



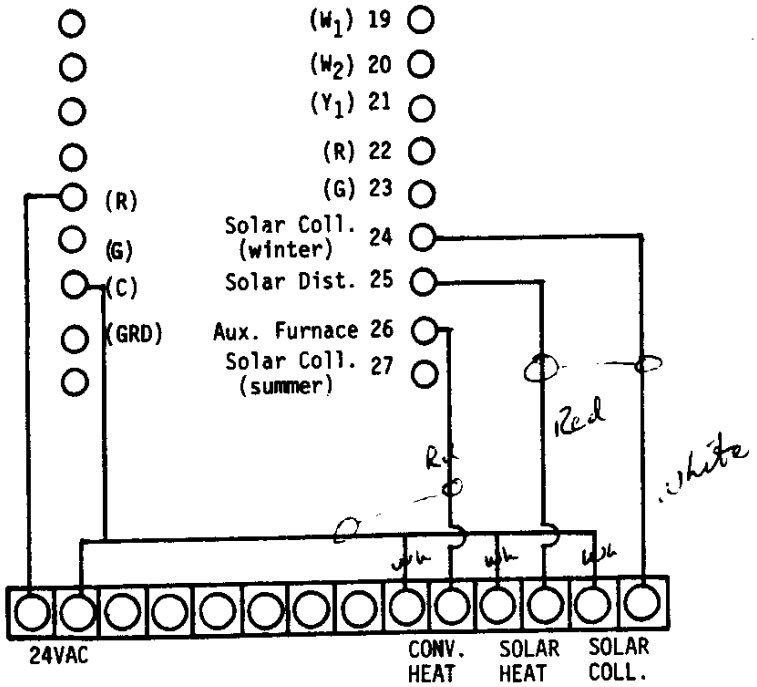
LOGIC TABLE

Input Thermostat Request	Solar Availability	Heat Mode	Output
H_1	No	Norm.or Econ.	G, Y
	Yes (SC)	"	SC, SD
	Yes (SD)	"	SD
	No	Emergency	G, E
	Yes (SC)	"	SC G, E
	Yes (SD)	"	G, E
H_1 & H_2	No	Normal	G, Y
	Yes (SC)	"	SC G, Y
	Yes (SD)	"	G, Y
	No	Economy	G, Y
	Yes (SC)	"	SC, SD
	Yes (SD)	"	SD
	No		G, E
	Yes (SC)		SC G, E
	Yes (SD)		G, E
H, H_2 & H_2	No	Norm.or Econ.	G, Y, W_2
	Yes (SC)	"	SC G, Y, W_2
	Yes (SD)	"	G, Y, W_2
	No	Emergency	G, W_2, E
	Yes (SC)	"	SC G, W_2, E
	Yes (SD)	"	G, W_2, E
C_1 & C_2	No		G, Y, O
	Yes (SC)		SC G, Y, O
	Yes (SD)		G, Y, O

L. SOLAR SENTRY CONNECTION DIAGRAM

If you are using a SCC Solar Sentry with your system the following connection can be used.

FIGURE (8L)
SOLAR SENTRY CONNECTION DIAGRAM



SOLAR SENTRY TERMINAL STRIP

Use these connections when you have a Solar Sentry to be used with the Solar Air Mover.

IX. PROBLEM ANALYSIS

A. PROBES

The probes can be checked by removing one lead of the probe from the controller; measuring the probe resistance with an ohmmeter; using the probe chart included in this manual to compare the temperature reading with the expected temperature reading (as measured by a thermometer or Solar Sentry etc.) at that time. Examples of probe malfunctions would be:

1. Sam collecting all the time. The collector probe might be shorted causing it to look hot all the time. The cold storage probe could be open causing it to look cold all the time.
2. SAM never collecting. Just the opposite of the above situation.
3. Auxiliary unit always coming on with a request for heat. The hot storage probe could be open always making solar storage look cold.

B. CONTROLLER

The controller can be evaluated by using the installation check out procedure included in this manual. The controller is typically very reliable unless connected improperly or subjected to high current loads.

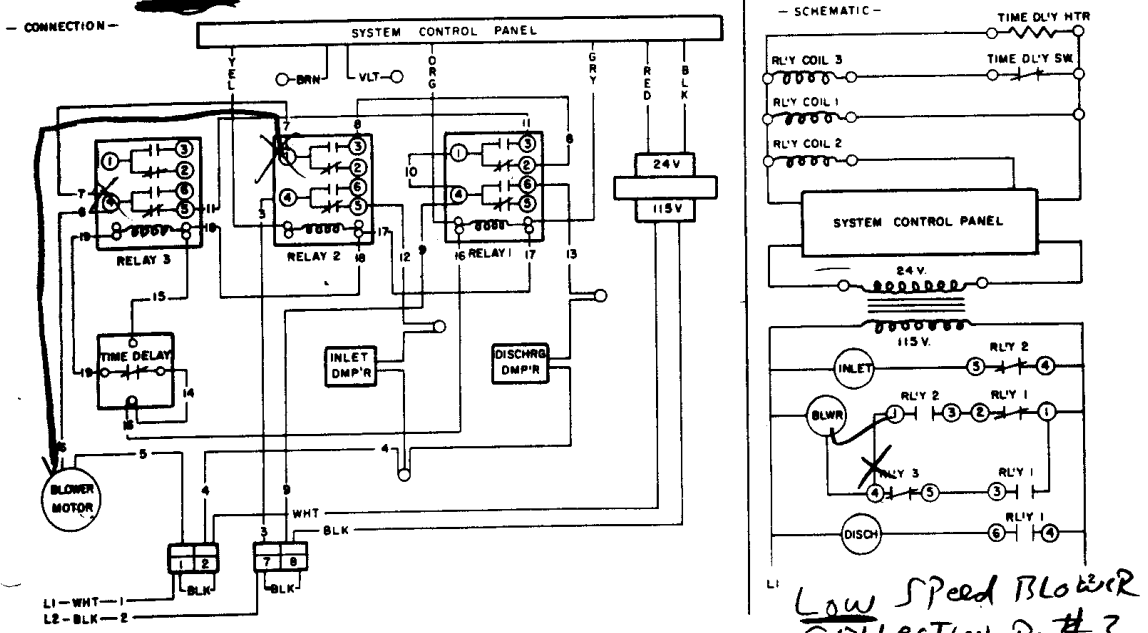
X. MAINTENANCE

It is recommended that every six months the SAM be given a visual inspection to insure that proper working order is maintained. The motor mounting, fan belt, pulley nuts etc. should be checked. The motor should be maintained per the motor label.

It would be desirable to check the damper operation to insure that both SAM and SAM controller are operating correctly.

XI. SAM WIRING DIAGRAMS

A. SAM 10 AND SAM 20



Low Speed Blower
Collection Pg #3.

B. SAM 30