



# Installation Manual

## **THE SUNSAVER™ SYSTEM YOU ARE INSTALLING:**

The solar collectors—

are built to commercial standards with large 2-inch, Schedule 40 headers and specially-formulated polymer extrusions

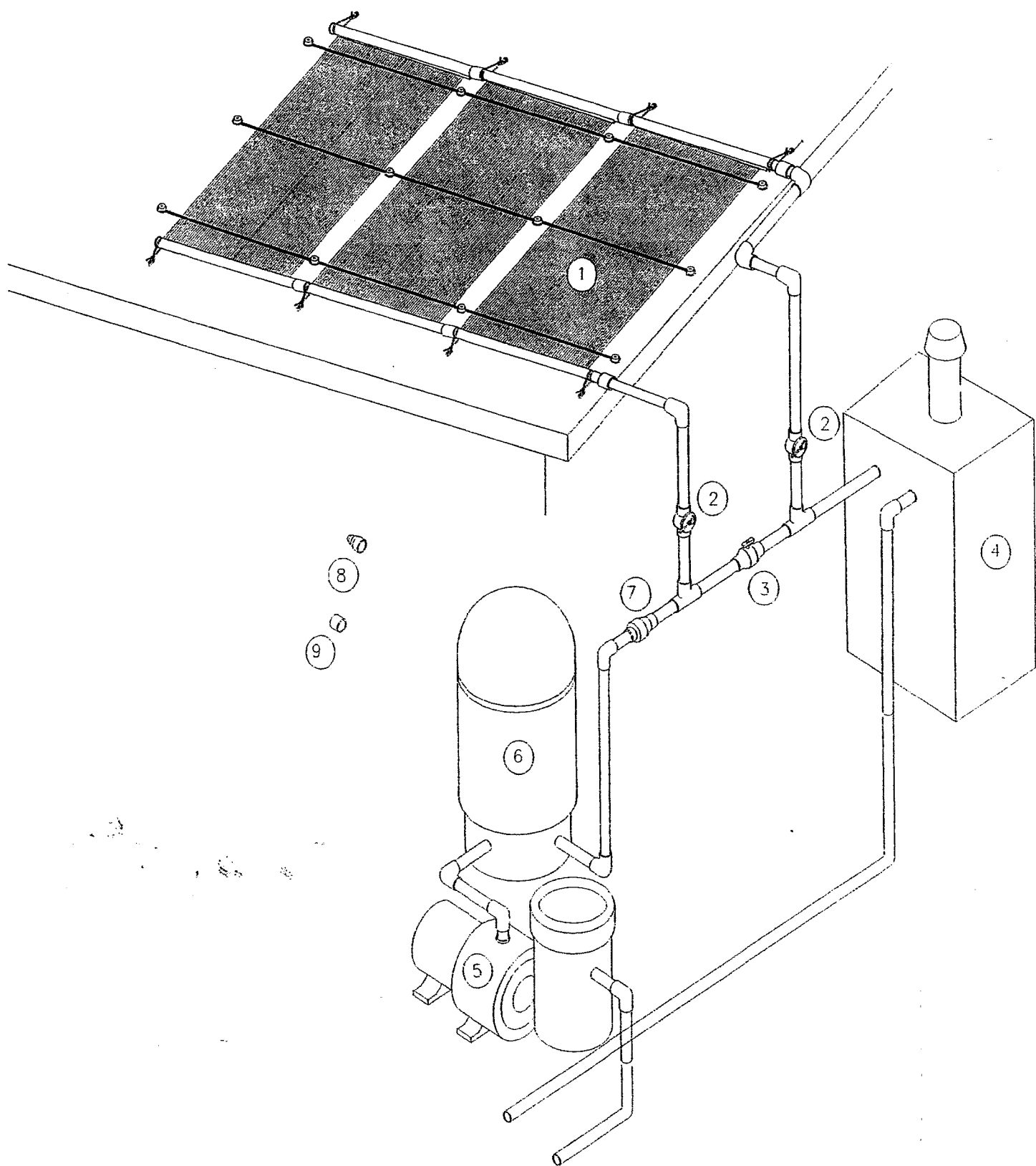
All accessories—

are an integral part of the system design and should not be substituted

The installation procedures—

in this manual have been proven in hundreds of thousands of panel installations throughout the world. To ensure years of trouble-free service, they should be followed with the exacting attention to detail that went into the design and manufacturing of your system.

**FAFCO**



# **WHAT DO THE VARIOUS COMPONENTS DO?**

## **1. The Solar Collectors**

are the heart of your system. They are the "heat exchangers" that collect the sun's heat and transfer it to the fast-flowing water that is being pumped through them from bottom to top for optimum efficiency.

## **2. The Isolation Valves**

two valves which are manually operated to isolate the solar system from the filtration system—primarily used when backwashing the filter, or at any time it is desirable to isolate the Solar Collectors.

## **3. Diverter Valve**

diverts the pool or spa water to the Solar Collectors.

## **4. Your Heater**

is only needed for supplemental heat boost. You must turn the heater off and on manually.

## **5 & 6. Your Pump and Filter**

are compatible with your FAFCO Solar System and will continue to do their job whether or not the solar is turned on. Your filter can be safely cleaned without damage to the solar system by following the instructions in the Owner's Manual.

## **7. Check Valve**

When the pump (5) shuts off, the Solar Collectors (1) will drain. The Check Valve prevents the water in the panels from flowing backwards through the Filter (6) and backflushing it into the pool.

## **8. Vacuum Relief Valve**

is installed at the highest point in your system to allow the Solar Collectors to drain.

## **9. End Caps**

seal the headers on the end Solar Collectors in the System.

# Before You Start

Always read complete installation manual instructions before starting. If you have any installation problems or questions consult your local SunSaver™ distributor. Remember to always conform to your local building codes.

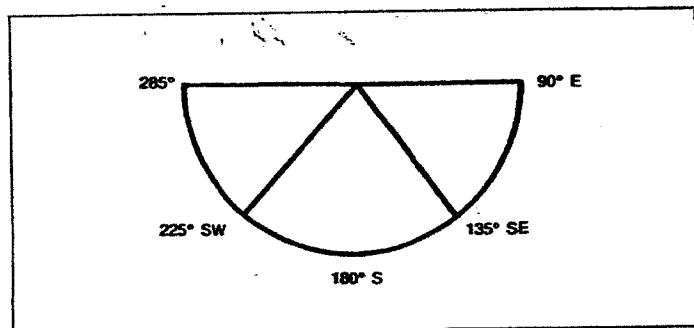
**SYSTEM PERFORMANCE.** The performance of the system is directly proportional to the number of panels installed. More panels than the minimum required will increase the ability of the system to heat a swimming pool under marginal weather or orientation conditions. Remember, minimum coverage = minimum benefits. Always consider increases of panel area on a percentage basis. For example: 10-panel system plus one panel = 9% increase.

**SITE SELECTION.** The ideal location for the solar panels is a **SOUTH-FACING PITCHED ROOF**, near the pool, with enough space for mounting the required number of panels. However, an installation on a west-facing roof is acceptable for summer heating, if the panel area is increased. Northern exposures are not acceptable and eastern exposures tend to be about 50% effective and, therefore, marginally economical. Fortunately, the modular nature of the solar panel makes it easy to tailor the system to a specific site. Be certain that the location you select is not shaded by trees or other structures. Remember, the effectiveness of a solar system is directly dependent upon the amount of direct sunlight that the panels receive.

The SunSaver™ solar panels come in 12', 10' and 8' lengths. All are 51 1/2" wide. When computing the actual installed dimensions of the entire system, allow an extra 12" around the perimeter of the bank to accommodate mounting apparatus, plumbing fittings and system accessories.

**OPTIMUM ORIENTATION.** The panels should be facing true south, for the Northern Hemisphere, with the inclination as follows:

1. For year-round heating: equal to latitude of installation.
2. For summer heating: equal to latitude minus 10° - 15°.
3. For winter heating: equal to latitude plus 10° - 15°. The inclination must always exceed 15° to ensure proper drainage.



**PANEL REQUIREMENTS.** A minimum of one-half to three-quarters of the pool's surface area in solar panels is the recommended "rule of thumb" for sizing a swimming pool solar heating system. (Example: 800 sq. ft. pool needs 400 to 600 sq. ft. of panel area.)

## MINIMUM RECOMMENDED COVERAGE

### SOUTH FACING

Collector surface area equal to 60% of pool surface area.

### WEST FACING

Collector surface area equal to 75% of pool surface area.

**PANEL MOUNTING INSTRUCTIONS.** The SunSaver™ solar panels will provide years of trouble-free service if they are installed properly. All of the clamps, couplers, straps, and brackets necessary to join the solar panels together and to secure them in place are included with the panels. The 1/4" lag screws recommended for use with mounting brackets are not included because the proper length varies considerably with different types of roofing. The SunSaver™ panel mounting system is designed specifically for the purpose of:

1. Accommodating the differential expansion and contraction associated with thermoplastic materials under different temperature conditions.
2. Providing a secure method of holding the panels in place during windy conditions (it is recommended to temporarily remove the panels if hurricane conditions are expected).
3. Allowing flexibility in attaching the mounting brackets to most roof designs.

**PANEL INSTALLATION SEQUENCE.** When transporting panels to the roof or rack and while positioning panels before mounting, be sure they do not strike any sharp surfaces (such as nails, corners of ladders or roof eaves).

1. Survey area to confirm proper fit.
  - a) If multi-bank installation, plan piping configuration.
  - b) If roof is cedar or shake shingle, locate subroof support member (stringers) and mark as appropriate for placement on top, bottom and panel body tie down brackets.
  - c) If you are constructing a rack for the panels be sure to consult your distributor for proper pitch and dimensions.
2. Lay down the first panel. Be certain it is straight and square on the roof.
3. Couple all panels in a bank together.
4. Make sure panel alignment on the roof is straight.
5. Secure 3 or 4 top ties to hold bank of panels in place.
6. After all panels are secured, install the vacuum relief valve and end caps.
7. Connect supply and return pipes to panels.
8. Be sure the return pipe(s) are from the common high point of the system.

## MATERIALS AVAILABLE THROUGH:

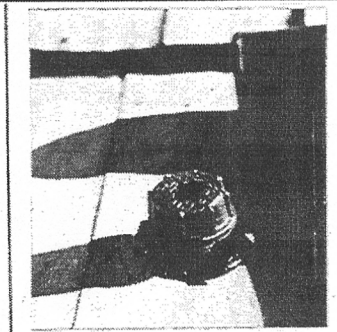
SunSaver™ Distributor	Local Retailer
4 x 12 Panels	Lag Bolts
4 x 10 Panels	Pipe Brackets
4 x 8 Panels	PVC Pipe-2"
Autocontrol	PVC Fittings-2"
Panel Racks	PVC Solvent Cement
Systems Packs	PVC Primer
Bank Packs	Black Paint
Split Packs	Sealant
End Caps	Isolation Kit
Vacuum Relief Valves	Roof Jacks

# Mounting the Solar Collectors

## BRACKET INSTALLATION



1. Locate bracket base on roofing above subroof or sheathing. (Do not attempt to attach brackets to roof material only!)
2. Mark and drill a pilot hole.
3. Inject the sealant into the pilot hole, being certain to leave enough on top of the hole so that a small amount will ooze out around the bracket when it is secured.
4. Put the lag screw into the bracket base and secure the bracket base to the roof.
5. Lay the panel strap through the bracket base. Panel straps can be put through single or doubled over.
6. Screw on a bracket cap and hand tighten. A 1/2" ratchet may be used to tighten the cap if desired.



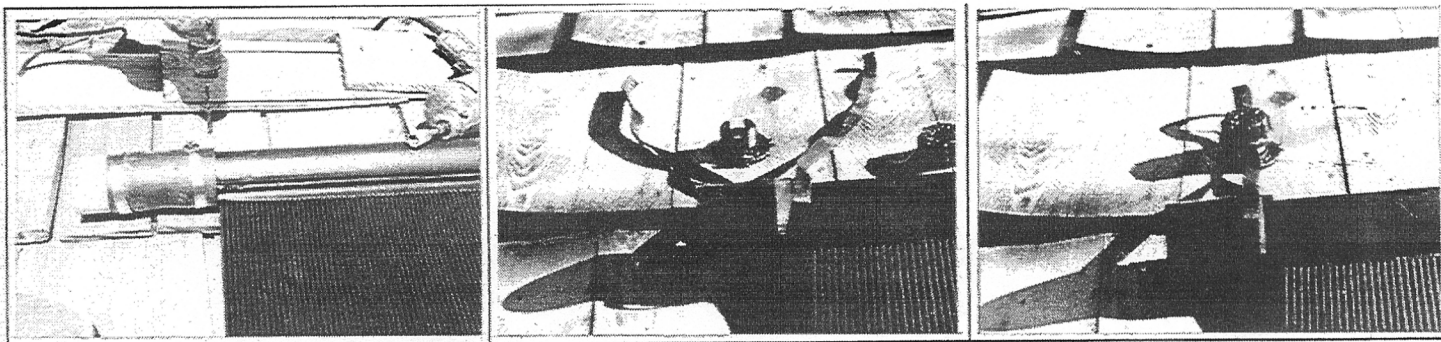
## BUILT UP ROOFING

A tar and gravel or tile roof requires special care. For further instructions contact your local distributor.

## SEALING SEQUENCE

SPECIAL CARE AND ATTENTION SHOULD BE EXERCISED IN SEALING THE LAG SCREWS WHERE THEY PENETRATE THE PRIMARY ROOF. FOLLOW THE DIRECTIONS CAREFULLY.

## TOP AND BOTTOM HEADER TIE-DOWN

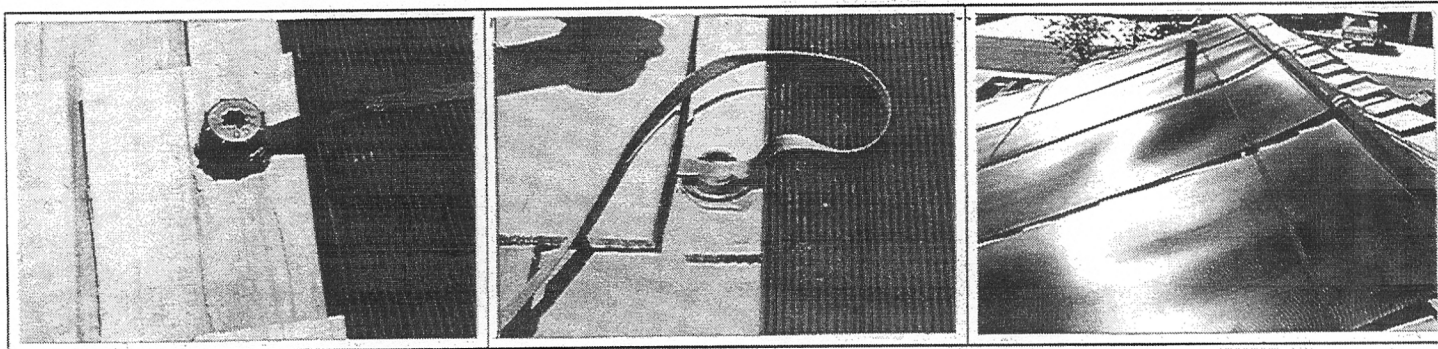


Both the top and bottom ties are secured the same way. Use the webbed strap for the top ties and the stretchy vinyl strap for the bottom ties.

1. Pass the strap around the rubber coupler.

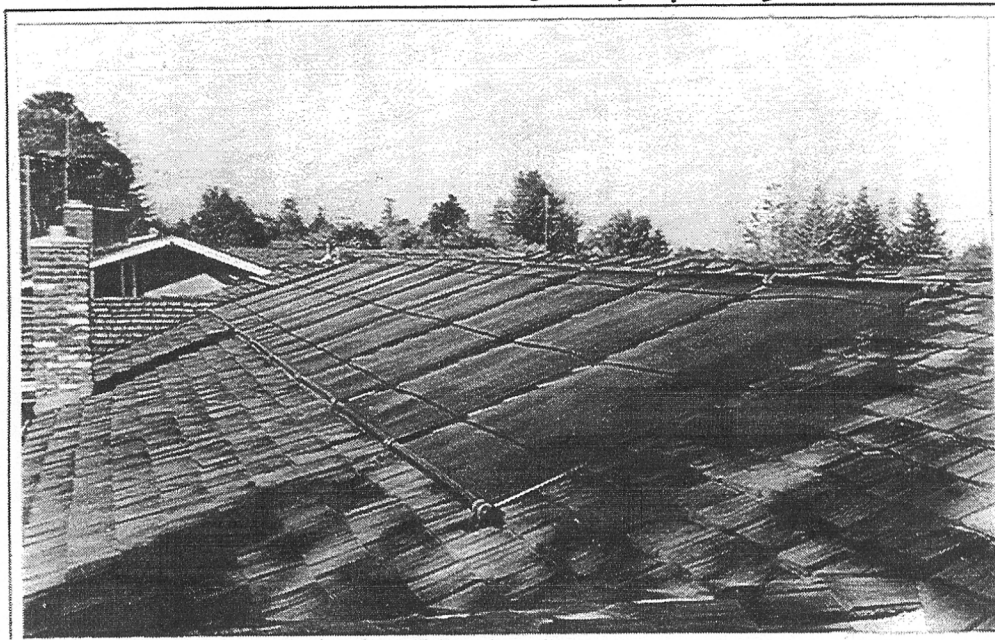
2. Mark a spot 4" to 7" from the header pipe of the panel.
3. Secure a mounting bracket at the spot you marked per the instructions above.
4. Lay both ends of the strap through the mounting bracket base and screw on a cap.

## PANEL BODY TIE-DOWNS



1. Begin installing panel body straps with an end panel.
2. Locate a mounting bracket base 10"—15" down from the top header.
3. Locate the same base 2" from the panel body.
4. Be certain the mounting base lag screw is located so it will penetrate the subroof or sheathing.
5. Mark and drill a pilot hole.
6. Inject sealant and secure base.
7. Pass a panel body strap through the base and double it back.
8. Screw on a bracket cap and tighten.
9. Locate the next mounting bracket base 9"—14" up from the bottom panel header.
10. Repeat steps 5 through 8.
11. Locate the next mounting bracket base centered between the other two bases.
12. Repeat steps 5 through 8.
13. Now go to the other side of the panel.
14. Locate the next mounting bracket base exactly the same distance down from the top header as the mounting base on the other side.
15. Center the bracket base and secure following steps 5 through 8.
16. Pass the already secured panel body strap through the base. Pass a new panel body strap through the same base from the other direction.
17. Screw on a bracket cap and tighten. (Be sure that the panel body strap is tight.)
18. Repeat steps 14 through 16 for the other two panel body straps aligning them per the brackets already mounted.
19. Continue mounting brackets and straps across the complete bank of panels being certain to follow carefully the instructions for sealing and mounting brackets properly.

20. Tie knots at the end of all strap.

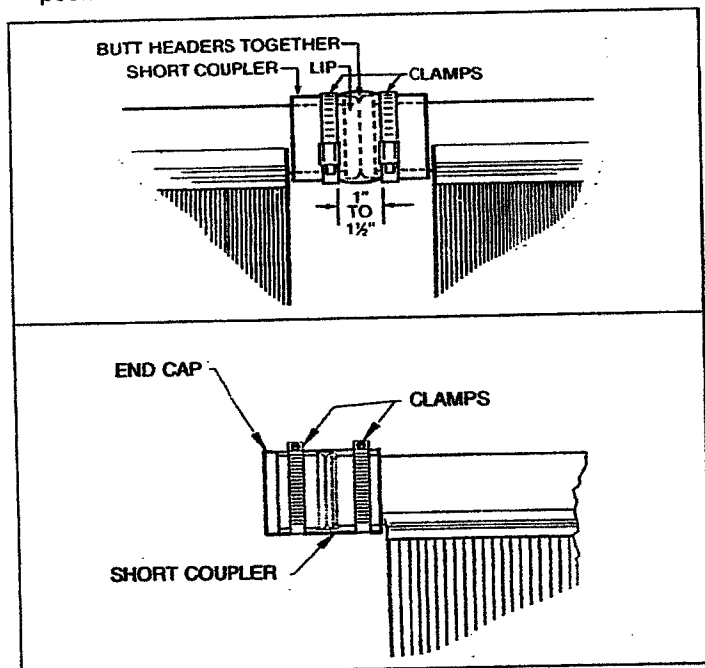




# Panel Coupling Assembly

## PANEL COUPLINGS

1. Short couplers (3 1/2" rubber couplers) are used to join the panels together and to attach the end cap and vacuum relief valve.
2. Long couplers (5 1/2" rubber couplers) are used whenever panels are joined to PVC pipe.
3. When coupling panels together, the clamps must be positioned close to the lip of the header.
4. The vacuum relief valve and end cap clamps must also be positioned close to the lip of the header.



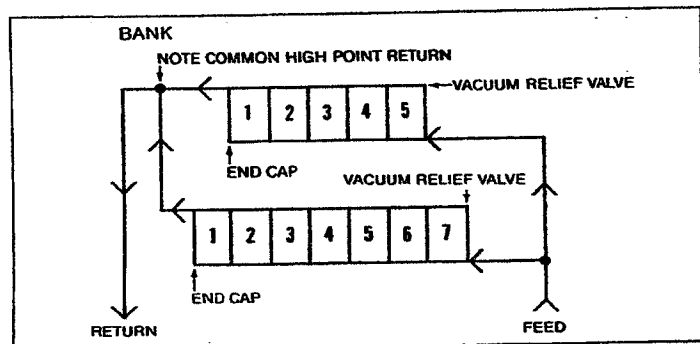
## 5. Tightening clamps:

- a) Tighten all clamps as they are installed.
- b) When you have completed the solar installation, retighten all clamps with the system on and water circulating through the collectors.
- c) Care must be taken when tightening clamps to ensure they are not installed crooked.

**NOTE:** It may be necessary to *split* the bank of panels in order to avoid obstructions on the mounting surface, or use multiple banks of panels to accommodate specific site requirements. Split packs or bank packs are available for use in this case.

## VACUUM RELIEF AND END CAPS

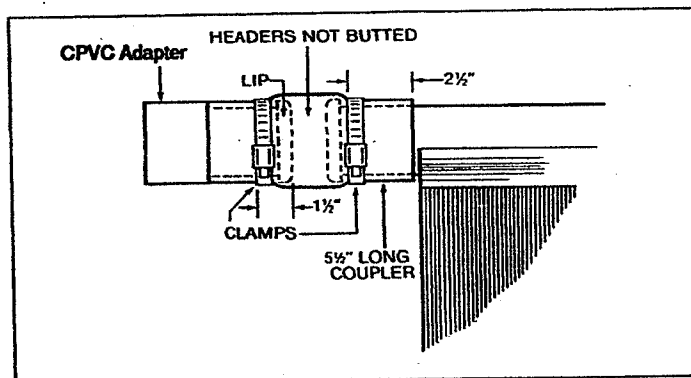
1. The vacuum relief valve should be used to seal the top header on END panels, (i.e., always place in the highest point of the system). Use 1 vacuum relief per bank.
2. End caps are used to seal headers on end panels.



## FEEDING WATER IN AND OUT OF THE SOLAR COLLECTORS

Long couplers are to be used when joining the panels to rigid PVC piping. Since the panel headers, SunSaver™ coupling hardware, and control pinch valve are all 2", it is advisable to adapt the existing pump house plumbing to 2" by the use of adapters (usually 1 1/2" to 2") which will allow for the use of all 2" PVC piping to and from the collectors. To connect the 2" PVC pipe to the solar panels:

1. Place long coupler over panel header and install clamp close to the lip.
2. Insert a CPVC adapter (with lip) into the long coupler.



**NOTE:** The headers are not butted when using long couplers.

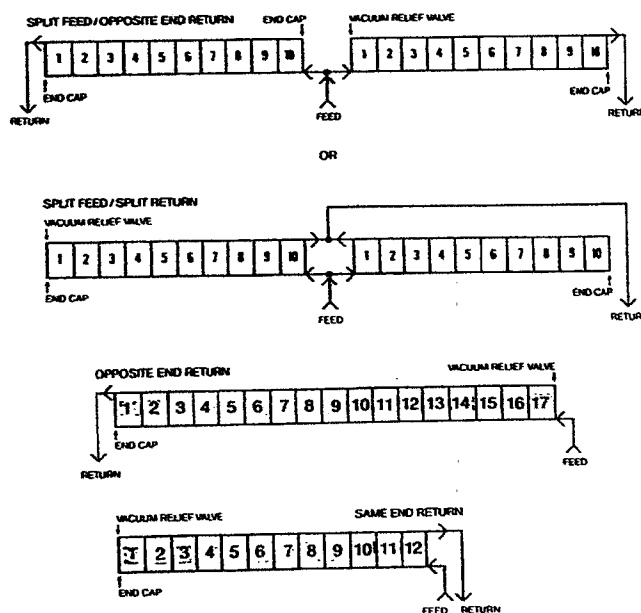
3. Use a 2" PVC pipe to glue the feed and return pipes to adapters.

**NOTE:** It may be easier to first glue the adapter to the pipe, then insert it into the long coupler.

4. Always feed the water to the lowest end of the collector bank (*never* feed to top header). Be certain to always return the water from the highest point in the system.

To ensure symmetry of flow, it is recommended that opposite end returns be installed on banks in excess of 12 solar panels. (No single bank should exceed 17.)

## Panel System Water Flow Diagrams



Water flow for your system will be site dependent.

# Check List and Troubleshooting

## SYSTEM CHECK

1. Turn the pool pump on and let it run 3 to 5 minutes before turning on the solar system. When starting up a new pool, allow filter to run for several days until water is clean. Foreign matter should be purged from pipes by disconnecting input and return lines at long couplers on roof. Flush pipes until all debris is clean (usually one minute of vigorous flow).
2. Turn the Automatic Control "function switch" to the on position.
  - a) There should be a slight increase on the pool filter pressure gauge (normally 2 psi to 6 psi) when the solar is turned on.
  - b) The pool inlets should actively bubble for 3 to 5 minutes as the air in the panels is being purged.
3. Check all plumbing joints for leaks.

4. Re-tighten all panel coupler clamps while the system is on.
5. Check all panel couplings for leaks.
6. Feel the surface of the panels.  
**NOTE:** This is the acid test—if the panel surfaces are "cool to the touch" then the solar system is operating properly.
7. Turn the Automatic Control function switch to the—"auto" position.

The SunSaver™ solar heater is designed and engineered to raise the pool temperature 2° to 6° per day (weather permitting). Your SunSaver™ solar heating system will now function completely automatically. (See owner's manual for further instructions).

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## Before You Call For Service

### Troubleshooting

To avoid unnecessary service calls, use this check list for your SunSaver™ System.

#### If The System Does Not Appear To Be Heating The Pool

1. Is the Filter and Leaf Trap clean?
2. Is timer set 8-10 a.m. to 4-5 p.m., or for at least 8 hours operation during solar hours?
3. Have you been refilling the pool with cold water a lot lately?
4. Has weather been marginal?
5. Are the panels operating "cool" to the touch on a sunny day?
6. If nighttime temperatures are very low, are you using a pool blanket to retain the heat provided by the solar system during the day?

#### If There Are No Initial Bubbles

1. Make sure the pump is turned on and is working (if it does not go on, check fuse if it has one, and check the power to the pump).
2. With Automatic Control in "On" position it is possible that the system is not supposed to be working because there is not enough radiant heat available.
3. Check Isolation Valves (5) to make sure they are open.

#### If Tiny Champagne Bubbles Continue

past the initial purging (3-5 minutes), this may be an indication that the water circulation through the panels has been reduced to the point where the Vacuum Relief Valve (mounted in the end of the solar collector array) is admitting air either continuously or intermittently; therefore: check Pump and Leaf Trap for proper operation and be sure the pool filter and leaf trap is clean. It is possible that some small bubbles will always be discharged into the pool due to the particular characteristics of the system's normal operation. They do not affect the operation of the system nor impair the proper function of any other pool equipment.

#### Occasionally Check the Automatic Timer

for your pool pump to see that the clock is set for the proper time. Power failures, adjustments for Daylight Saving Time, etc. will put it behind. It will be necessary to adjust the timer according to the season so that the Solar System will operate during the most beneficial hours of the day.

#### Pool Cleaner Timer

Special care must be taken when setting the timer for automatic pool cleaning equipment. Set your pool cleaning equipment timer to turn on after the solar system. Typically, operating hours between 12:00 and 8:00 a.m. or p.m. are acceptable. This precaution prevents air from entering and possibly damaging pool cleaning equipment during the startup of your solar system.