

SunCache ICS

Glazed Integral Collector Storage System

SRCC OG-300 Certified Solar Water Heating System

System Model No.		Backup Water Heater Type
Single Unit Systems	Double Unit Systems	
SCG-50-ES	SCG-100-ES	Electric Storage
SCG-50-GS	SCG-100-GS	Gas Storage
SCG-50-GT	SCG-100-GT	Gas Tankless

Installation, Operation & Maintenance Manual

SUNCACHE INTEGRAL COLLECTOR STORAGE SOLAR WATER HEATER (GLAZED CONFIGURATION)

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

The SunCache[®] solar water heating system has gone through an extensive design, technical and performance review by the Solar Rating & Certification Corporation (SRCC). The installation of your SunCache system is intended to be executed in accordance with SRCC Standard OG-300, "Operating Guidelines and Minimum Standards For Certifying", and must conform to applicable federal, state and local regulations, codes, ordinances and standards governing the installation of solar water heating systems.

The solar energy system described by this manual, when properly installed and maintained, meets the minimum standards established by the SRCC. This certification does not imply endorsement or warranty of this product by the SRCC.

OG-300 system certification is granted to Harpiris Energy by the SRCC. It may not be used for any commercial purpose without the prior written consent of HARPIRIS. HARPIRIS must approve any deviation from the materials and methods described in this manual in writing.

Integral Collector/Storage (ICS) units may be safely installed in areas within the continental United States that experience mild winter climates. Because of the large volume of water in the SunCache panel, it will not readily freeze. Copper attic piping, however, is susceptible to freeze damage if installed where local temperatures have ever fallen to:

10°F or less for 6 consecutive hours, or

14°F or less for 18 consecutive hours

When these environmental conditions are met or exceeded the *piping* must be manually drained in accordance with the instructions in this manual and cleared using pressurized air. Failure to do so will void the warranty coverage. Drain the SunCache panel by siphon. PEX tubing has been shown to survive multiple freeze-thaw cycles and does not need to be drained in typical ICS climates. (PEX-AL-PEX with aluminum oxygen barrier is not freeze tolerant and should not be used with SunCache.)

Freeze tolerance limits are based upon laboratory testing of the panel, and do not account for solar input. Extended periods of cold weather, including ambient air temperatures above the specified limit may cause freezing in other parts of the system. Typical SunCache installations locate the piping inside the attic space. Exterior piping will freeze at temperatures above the specified limit. It is the system owner's responsibility to

protect the SunCache ICS and piping in accordance with HARPIRIS' instructions if the air temperature is anticipated to approach the specified freeze tolerance limit.

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PREFACE

Thank you for your purchase of a SunCache solar water heating system! Harpiris Energy sincerely appreciates your business. Solar water heating reduce our nation's dependence on polluting fossil fuels, minimize the greenhouse gas emissions associated with conventional water heating, and lower your monthly utility costs.

Your SunCache system has been designed to meet exacting SRCC certification requirements. It has attained SRCC OG-300 certification. All mounting and plumbing components are included in the SunCache kit except for PEX or copper pipe, pipe insulation and a thermostatic mixing valve. The components found in your system have been selected for their proven reliability, longevity and performance.

For technical support, please visit the Harpiris Energy [website](http://www.suncache.com), or contact us at suncache@harpiris.com.

1) INTRODUCTION

Solar water heating systems are climate and site specific appliances. Different types of solar systems are installed around the world based upon local and regional weather and water conditions. System performance varies as a function of household hot water load, including daily showers and baths, laundry and kitchen uses, local ground water and ambient air temperatures, your home's roof pitch and orientation and, of course, the seasonal intensity of solar radiation. These variables, some of which change from home to home in the same neighborhood, will determine how much energy and money your SunCache system will save on an annual basis.

This manual is intended as a basic ICS solar water heating primer. Our goal is to familiarize you with the proper installation, operation and maintenance of your SunCache ICS system. This system is required to be installed in accordance with SRCC certification requirements and all applicable national, state and local codes, ordinances and regulations governing solar water heating systems as well as good trade practices. Failure to follow the procedures and practices described in this manual can void the manufacturer's warranty for specific component parts.

2) SYSTEM DESCRIPTION AND OPERATIONAL PRINCIPLE

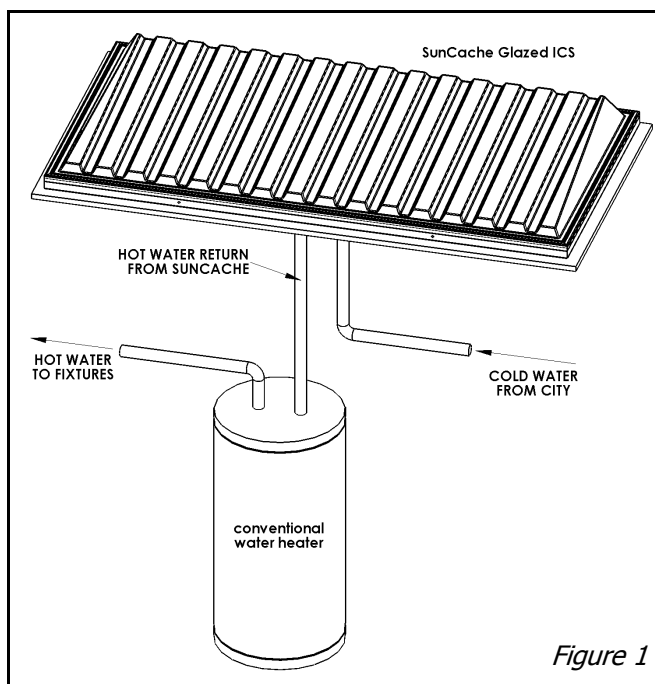


Figure 1

The SunCache is an integral collector storage (ICS) system. ICS systems combine the collector and storage tank in a single roof-mounted unit. ICS systems, in general, serve as pre-heaters for conventional electric or gas water heaters, as shown in Figure 1. A SunCache ICS may also be used in conjunction with a tankless, wall-mounted instantaneous gas water heater. In some parts of the world the SunCache may serve as the sole water heater with or without a glazing.

The SunCache ICS also is referred to as a "passive" system because it does not require pumps, thermostats, controllers, sensors, wiring or electricity to make hot water. Your SunCache ICS will neither freeze nor overheat during prolonged periods of disuse if installed and maintained in accordance with the instructions contained in this manual.

The inherent simplicity and durability of the SunCache ICS makes it a popular choice for the continental U.S. Sunbelt or markets outside the U.S. where persistent hard freezes do not occur. Although the SunCache is freeze protected by its thermal mass, copper supply and return piping (if used) can burst when ambient temperatures drop below 10°F for a six hour period, or below 20°F over an eighteen-hour period. When such conditions are expected the *piping* (but not the panel) must be manually drained. PEX piping can tolerate multiple freeze-thaw cycles and does not need to be drained.

Even though the SunCache panel can survive a solid freeze, deep freezing conditions will damage the internal copper heat exchangers. SunCache should not be installed in locations where conditions below 24°F occur on an annual basis.

The SunCache panel is rotationally molded from an advanced grade of polyethylene. During installation, it is filled with 50 gallons of potable water that remain there throughout the product life. Inside the panel is a copper heat exchanger that transfers heat from the panel water to incoming city water. The heated city water then goes to the conventional water heater. A clear plastic cover insulates the unpressurized panel. The pressurized potable water is fully contained in the copper heat exchanger and never contacts the panel. (However, polyethylene is a food-safe plastic that is used to make many food containers.)

The SunCache ICS is used in conjunction with a conventional electric or gas water heater. Your SunCache ICS system is plumbed to accommodate two modes of operation. In the first mode, the SunCache preheats water entering the electric or gas water heater. The second mode bypasses the SunCache unit.

The placement of the valve handles located above your back-up water heater is **extremely important** and will determine how your system functions and how much energy you will save. Periodically check your valve handle placement against the settings shown in Figure 23 and Figure 24.

3) PRE-INSTALLATION REQUIREMENTS

- A. The contractor shall obtain all required permits and approvals.
- B. The installation shall conform to all federal, state and local regulations, codes, ordinances and standards governing solar water heating system installations, and the contractor shall adhere to sound building safety and trade practices. Special consideration must be given to building code requirements for roof loading and the penetration of structural members and fire rated assemblies.
- C. The SunCache must be located in a structurally sound area of the roof that will be unshaded for the majority of the day all year round. Adjacent buildings and trees should be checked for possible winter shading. An instrument such as the Solar

Pathfinder (www.solarpathfinder.com) can be used for solar site analysis.

- D. Before the installation, the contractor shall inspect the condition of the roof and notify the homeowner of any existing roof damage or necessary repairs.
- E. The homeowner and contractor shall confirm the location of all roof and ground mounted components in advance of the installation.

4) INSTALLATION BASICS

The standard SunCache installation is to mount the collector flush on a composite shingle roof over an attic or garage, with either a electric or natural gas storage (tank-type) water heater. All necessary mounting equipment and fasteners are included in the standard SunCache kit. For installation on tile or wood shake roofs, refer to the Section 8. For all other installation types, such as vaulted ceilings, metal or flat roofs, or rack mounted, please contact Harpiris Energy.

For installation with a tankless water heater, refer to Section 12-B.

Follow these general guidelines when mounting the SunCache:

- READ ALL INSTRUCTIONS BEFORE STARTING INSTALLATION.
- THE ROOF MUST BE RATED TO SAFELY SUPPORT THE WEIGHT OF THE UNIT WHEN FILLED WITH WATER.
- AVOID DRY STAGNATION. Do not put the unit on the roof until you are ready to secure it in place. Keep both fill ports open until the panel is filled with water. Do not place the panel unless you can finish the installation immediately. Fill the panel as soon as possible.
- Do NOT sweat plumbing fittings onto or near the stubs on the panel. This can melt the panel and cause leaks.
- All of the fasteners included in the installation kits are stainless steel. If for some reason you need to substitute other fasteners, use only stainless steel components.

- The SunCache should be mounted as close to the water heater as practical to minimize heat loss in the piping runs.

- PEX PIPE IS RECOMMENDED BY HARPIRIS ENERGY FOR ALL LOCATIONS, unless prohibited by the local jurisdiction. PEX tubing is cheaper, faster to install, and most importantly, far more freeze resistant than copper pipe. (Confirmed by laboratory testing at NREL.) Do NOT use oxygen barrier PEX-AL or PEX-AL-PEX tubing which has an aluminum layer that will rupture if the lines are frozen.

- Preserving the integrity of the roof membrane is the most important roofing consideration. Ensure that all roof penetrations required to plumb and mount the solar collector are properly flashed and sealed in accordance with standard roofing practices, using the sealants listed in Section 10.

- The Quadflo bypass valve should be set to solar pre-heat at all times other than for maintenance. Winter heat loss is minor (on an annual basis) and the flow of water through the unit will prevent freeze damage.

5) ROOF LOCATION

Chose the location of the SunCache collector carefully. Take into consideration: shading, orientation, tilt, and access to the existing water heater. Shorter runs are preferred. The SunCache MUST be oriented with the inlet and outlet pipes at the top.

Each SunCache glazed ICS unit weighs 525 pounds (16 PSF) when filled. DO NOT proceed with the installation unless the roof can safely support the unit. Refer to Section 9 for structural specifications.

6) ORIENTATION

The thermal performance of the SunCache is optimized in the Northern Hemisphere when the unit is mounted facing True South. Actual performance, however, suffers very little when the unit is oriented no more than 45° East or West of True South. HARPIRIS does not advise mounting the SunCache on a roof more than 45° East or West of True South. Field testing has indicated a collector facing due West to have 30% less output than south facing collectors. The unit should be unshaded for the middle six hours of each day throughout the year.

7) TILT AND ROOF PITCH

Because the SunCache rests directly on the roof, the slope will have some impact on thermal performance. A rule of thumb for solar water heating is to match the latitude of your location, equivalent to 5-1/2 and 9 -in-12 roof pitches for SunCache install areas. However, there is little benefit to be gained if your roof pitch does not match the rule of thumb. Rack mounting a SunCache unit is more difficult and presents more chances for roof leaks. By spacing the unit off the roof, a rack allows heat losses from the backside, which are normally stopped by the semi-conditioned attic space beneath it. SunCache can be installed on roofs up to 12-in-12. DO NOT MOUNT THE UNIT STEEPER THAN 12-IN-12.

8) FLAT ROOF MOUNTING

SunCache performance is not strongly affected by installation directly on flat roofs. Annual savings will be about 10% less than for optimal pitch, but this is often offset by the reduced impact of shading and non-due-South orientation when installing on flat roofs.

Harpiris Energy recommends installing SunCache flush with a flat roof, as long as there is a minimal roof slope to accommodate drainage. (1/4-in-12 is sufficient) As with pitched roofs, try to orient the unit facing due South if possible.

If a rack mount is desired, we recommend using a platform made from marine-grade plywood covered with single ply roofing membrane, or similar. THE BACKSIDE OF THE PANEL MUST BE FULLY SUPPORTED.

9) TILE ROOF MOUNTING

SunCache installation on tile (or wood shake) roofs requires removal of the tiles in the area where you wish to locate the SunCache unit, and from there down to the eave. A layer of asphalt shingles shall be laid down in the SunCache location, and extended down to the eave, as shown in Figure 2. Mount the SunCache unit on the shingles using the instructions in this manual. After installation is complete, replace tiles around unit, trimming tiles where necessary for cosmetic purposes, as shown in Figure 2 and Figure 3.

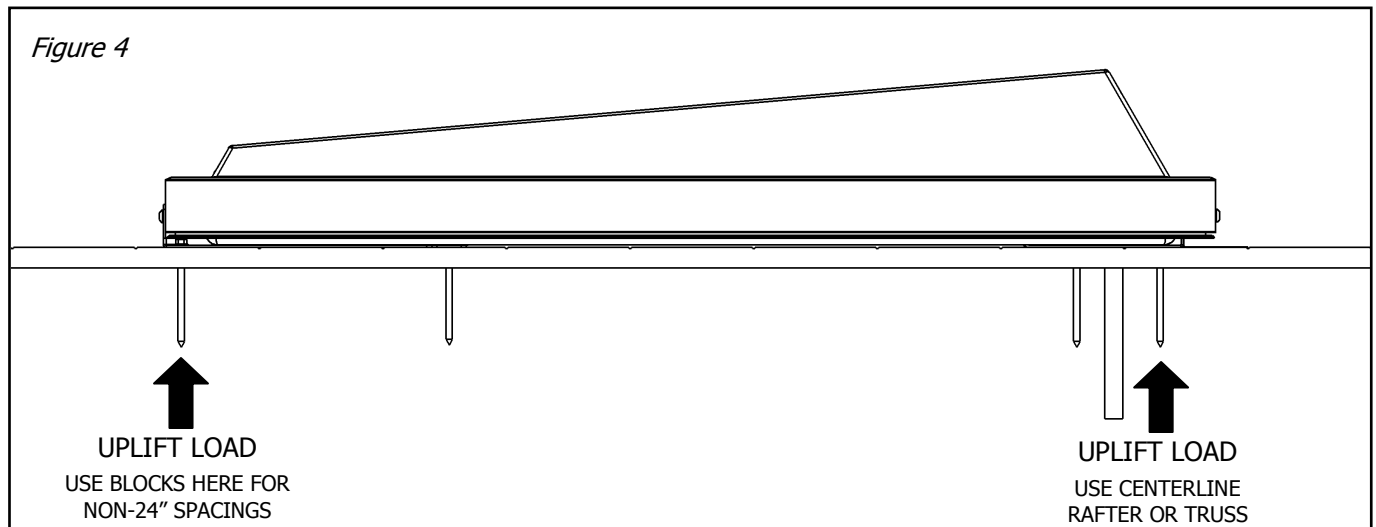
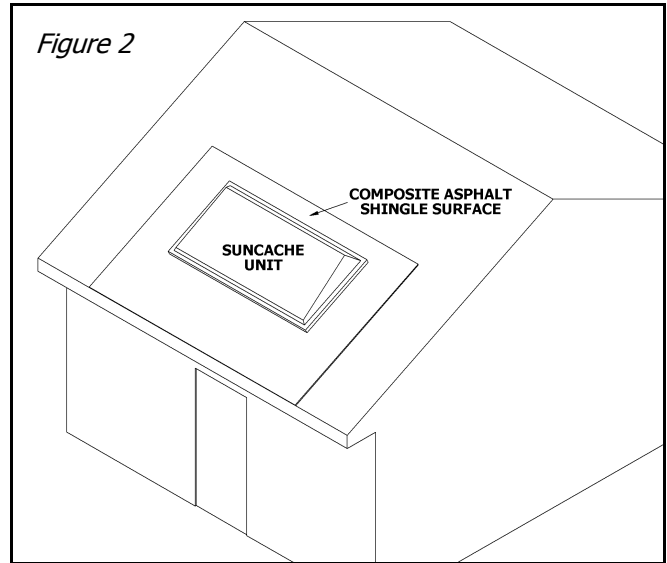
10) WOOD SHAKE ROOF MOUNTING

Refer to Section 9.

11) ROOFS WITH RAFTERS/TRUSSES AT INTERVALS OTHER THAN 24" ON CENTER

SunCache is designed for the majority of U.S. roofs that have rafters or trusses at 24" spacings (on-center). It can accommodate actual spacings from 23" to 25" without modifications. For spacings outside these limits by 1-1/2" or less, you can usually "scab" a piece of 2x6 onto the side of the existing rafters.

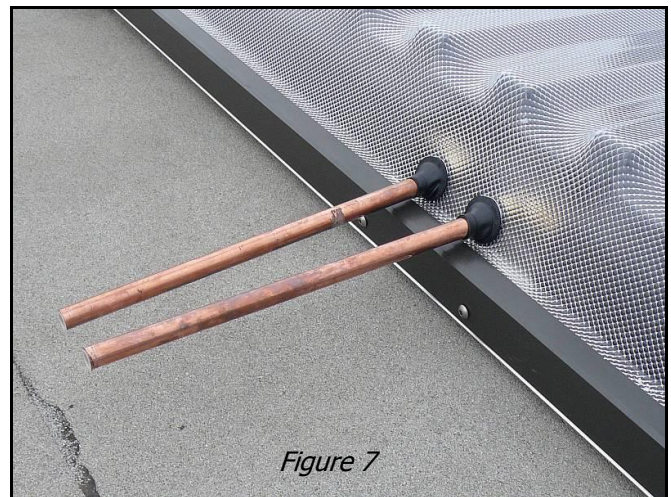
Older homes often have full-rough timbers at 32", and flat roofs can be 16". For these and other non-24" cases, it is necessary to install 2x4, 2x6, or 4x4 wood blocks to span the openings between rafters. The upper mounting plate should always be placed on the centerline. Because the primary loading on the lag bolts is uplift, which is only applied to the uppermost and lowermost bolts, it is only necessary to block the two outboard lowermost tie-downs. This is shown in Figure 4.



12) VAULTED (ATTIC-LESS) CEILINGS

In normal SunCache installations, the supply and return lines penetrate the roof through the upper mounting plate and are completely hidden from view by the cover plate and glazing. In the cases where there is no attic underneath the unit, the supply and return lines must be run externally to a location on the roof where the lines can be run to the water heater location. In such cases, suitable roof jacks shall be used for any roof piping penetrations.

For installations on vaulted, cathedral, or other roof types where there is not sufficient access for supply and return lines directly underneath the unit, exterior lines above the roof are required. The unit shall be mounted normally, except that the piping holes should NOT be drilled. Instead, holes shall be drilled in the glazing 4" apart (on center) using a 2" hole saw. Drill the holes as low as possible in the top of the glazing, as shown in Figure 5. Remove the grommets from the Upper Mounting Bracket and place them in the holes that you just drilled in the glazing. Install 1'-2' copper pipes into the Sharkbite elbows and onto the panel stubs. Guide the stubs through the grommets as shown in Figure 6. Bolt the glazing down as described in Step 15 and shown in Figure 7. **DO NOT USE PEX PIPE FOR EXTERIOR PIPING RUNS.** PEX will not survive in direct sunlight due to UV breakdown. Because there is always the risk that the insulation will come loose, we recommend using only copper pipe for exterior runs.



13) STRUCTURAL SPECIFICATIONS

THESE SPECIFICATIONS ARE GIVEN ONLY AS A GUIDELINE. HARPIRIS ENERGY DOES NOT ASSUME LIABILITY FOR THESE CALCULATIONS. NO WARRANTY IS GRANTED OR IMPLIED.

The purpose of this exercise is to determine if the rafter spans in your roof are able to support the SunCache unit in compliance with building codes. If not, suggestions for reinforcement are provided.

Determine the following parameters about the roof section on which you intend to mount the SunCache collector:

- A. Rafter nominal lumber size
- B. Rafter spacing (on-center)
- C. Roof type
- D. Roof pitch
- E. Is there a sheet rock ceiling hanging from the rafters? (if so, consult website)
- F. RAFTER SPAN LENGTH

Using the table below, determine the maximum rafter span length for your roof. This is the distance from the ridge beam to the exterior wall top plate. If the rafter span length in your roof is LESS than the Maximum Span Length for your roof configuration, reinforcement IS NOT required.

If the rafter span length in your roof is MORE than the Maximum Span Length for your roof configuration, reinforcement IS required. For garage installations, existing rafters can be doubled up, resulting in the reinforced spans in the table below. For attic installations, the addition of three "kicker" beams to a load bearing wall under the unit is usually sufficient. Contact Harpiris Energy for discounted structural engineering services.

TRUSS roofs are generally custom-designed, and therefore they will usually require consultation with a structural engineer.

Structure Type	Rafter Size (nominal)	MAXIMUM RAFTER SPAN LENGTHS			
		Composite Asphalt Shingles		Tile	
		Pitch < 4:12	Pitch ≥ 4:12	Pitch < 4:12	Pitch ≥ 4:12
UN-REINFORCED ROOFS					
Single rafters 24" apart O.C.	2x4	6'-0"	6'-9"	6'-0"	6'-0"
	2x6	9'-3"	10'-0"	8'-9"	9'-3"
	2x8	11'-9"	12'-9"	11'-0"	11'-6"
	2x10	14'-6"	15'-6"	13'-3"	14'-0"
	2x12	16'-9"	18'-0"	15'-0"	16'-0"
REINFORCED ROOFS					
Doubled-up rafters 24" apart O.C.	2x4	7'-9"	8'-0"	7'-6"	7'-9"
	2x6	12'-6"	13'-0"	11'-6"	12'-0"
	2x8	16'-6"	17'-0"	15'-0"	15'-6"
	2x10	20'-9"	21'-9"	18'-9"	19'-6"
	2x12	23'-9"	25'-3"	21'-3"	22'-3"

Maximum rafter span lengths calculations were based on the 2007 International Building Code and 2007 California Building Code. The 162 page structural report along was prepared by a licensed California civil engineer and was used to generate the data in this table. The full report (along with an abbreviated version) can be downloaded at www.harpiris.com.

14) TOOLS AND MATERIALS NEED FOR INSTALLATION

DO NOT ATTEMPT SUNCACHE INSTALLATION UNLESS YOU HAVE ALL OF THE ITEMS LISTED IN THIS SECTION.

MATERIALS needed for COLLECTOR mounting:

- Approved sealants:
 - Sikaflex 201, 201US, 219LM, 290DC, 295UV, 521UV, SikaSil GP
 - Dow Corning Silicone Structural Sealant 795 or 995
 - Henry 209

TOOLS needed for COLLECTOR mounting:

- Standard 7/32" drill bit
- Long 7/32" drill bit (at least 6" long)
- 1/4" drill bit
- 1-1/4" hole saw with 1/4" arbor
- 1/2" socket and box wrenches
- 7/32" hex key
- 7/32" hex driver socket
- Heavy-duty cordless drill or torque driver with socket drive adapter
- Thin pry bar or heavy-duty scraper (to lift shingles)
- Caulking gun
- Sheet metal snips
- Hammer
- Tape measure
- Flashlight
- Garden hose

MATERIALS needed for system PLUMBING:

- 3/4" PEX pipe (do not use PEX-AL-PEX)
- 3/4" or 1" thick foam pipe insulation (such as Rubatex Insulatube)
- Tape to seal insulation joints
- Lead-free solder for drinking water applications
- Flux paste (such as Nokorode brand)
- Thermostatic mixing valve (AKA tempering valve)
- 3/4" type L copper pipe to plumb pressure relief valve drain line and mixing valve
- 3/4" copper fittings (tees, elbows, MNPT and FNPT adapters)
- 3/4" brass
- PTFE pipe thread tape
- Copper-flex connection lines (optional)

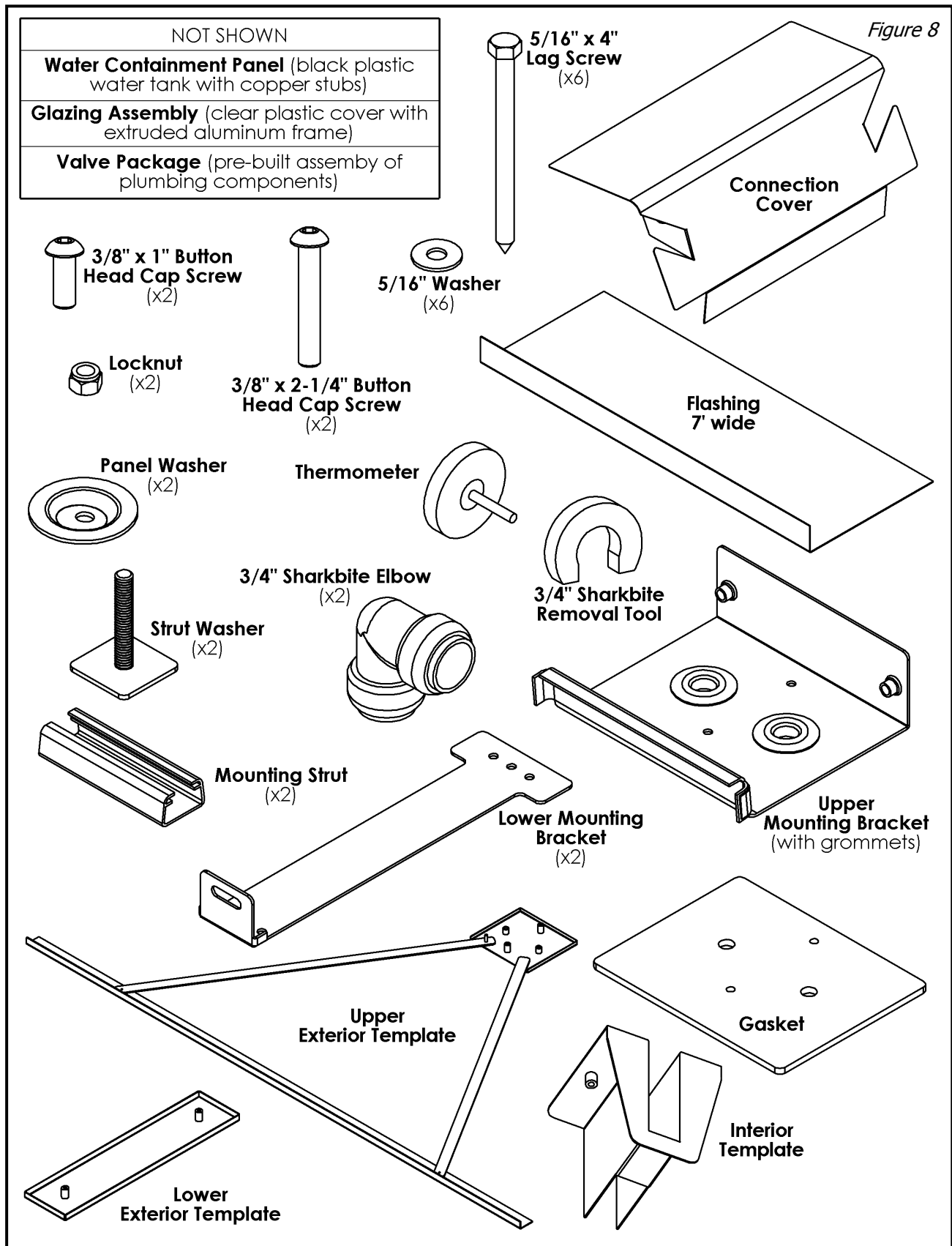
TOOLS needed for system PLUMBING:

- Torch with MAPP gas
- Tubing cutter
- De-burring tools
- Large Channellock pliers
- Pipe wrench

15) COLLECTOR INSTALLATION INSTRUCTIONS

**THE FOLLOWING PAGES CONTAIN STEP-BY-STEP
INSTALLATION INSTRUCTIONS FOR THE
STANDARD SUNCACHE COLLECTOR INSTALLATION
ON A COMPOSITE SHINGLE ROOF**

Step 1. Identify auxiliary parts shown in Figure 8. Quantity is 1x unless otherwise noted. The ICS unit is shown on the cover of this manual. Except for the Valve Package and Interior Template, lift all other parts onto the roof.



Step 2. Select the installation location following the principles described in Sections 4 to 7. The roof shall face south and be between 2-in-12 and 12-in-12 slope. Only one rafter or truss is used, under the centerline of the SunCache. The unit is 100" x 50" and must be installed horizontally.

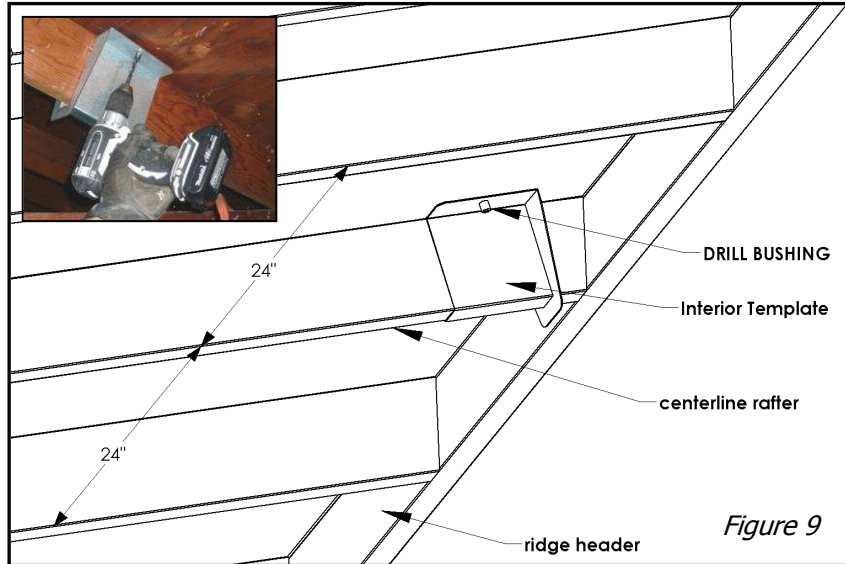


Figure 9

Step 3. From INSIDE the attic, place the Interior Template against your centerline rafter, as shown in Figure 9. Drill through the template using a 7/32" drill bit. THE TOP EDGE OF THE SUNCACHE UNIT WILL BE 5" UPHILL OF THE HOLE.

Drill only ONE hole from inside the attic.

Move about 3' down the centerline rafter toward the eave and measure the spacing to the rafters on either side of the centerline rafter. Write this measurement down for Step 4.

THE INDOOR CREW MEMBER SHOULD START INSTALLING THE VALVE PACKAGE AS DESCRIBED IN SECTION 12.

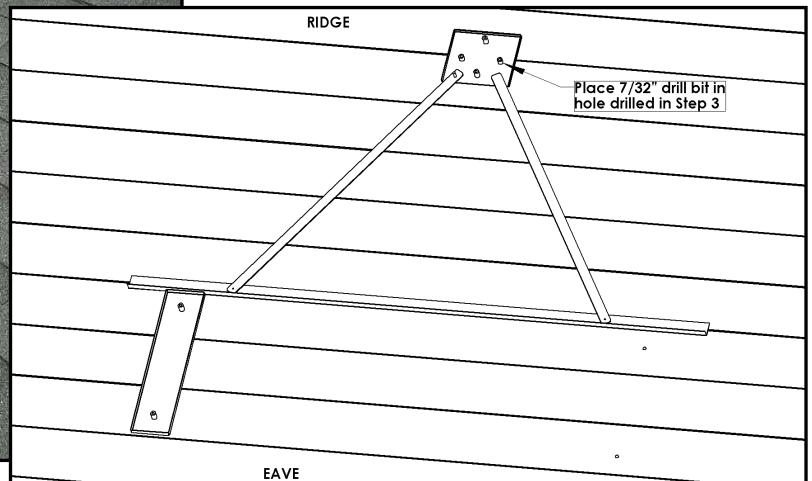
Step 4. Assemble the exterior templates on the roof as show in Figure 10. Place the Upper Exterior Template on the roof so that the shorter 7/32" drill bit goes through the hole drilled in Step 3 (see Figure 10). Make sure to use the drill bushing on the same side of the rafter as in Step 3.

Adjust the Upper Exterior Template so that the horizontal leg matches the shingle slope. There are two different size drill bushings – 1/4" and 7/32". Use the corresponding drill bits to drill the other 1/4" hole and the two 7/32" holes. Use the 6" long 7/32" drill bit to drive all the way through the rafter to confirm the hole is within 1/4" of the rafter centerline.

Line up the center mark on the Lower Exterior Template with the rafter spacing dimensions measured in Step 3. Drill two holes in each rafter (6 total) using the 6" long 7/32" drill bit.



Figure 10



Step 5. Enlarge the two ¼" holes using a 1-1/4" hole saw with a ¼" arbor as shown in Figure 11.



Figure 11

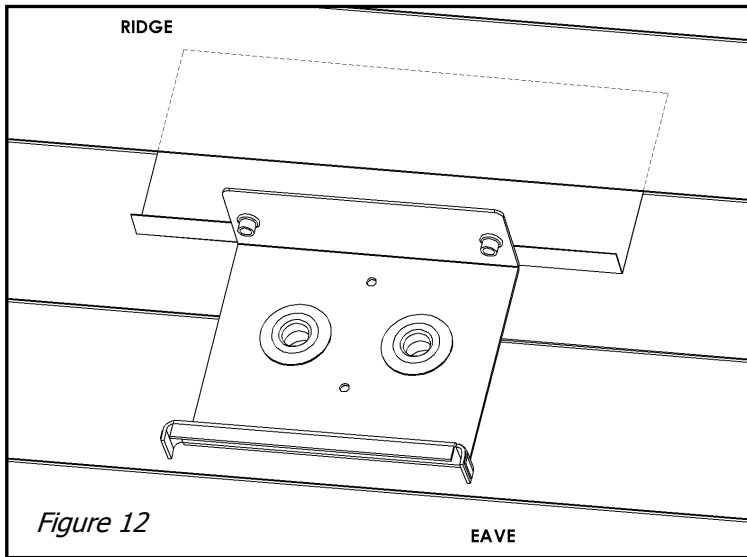


Figure 12

Step 6. Place the Upper Mounting Bracket on the roof so that the holes in the bracket and the roof line up. Place the Flashing above the bracket to check which shingle row it needs to go under, as shown in Figure 12. Remove the bracket and slide the flashing under the correct shingle row. Be careful to lift older shingles gently to avoid cracking, especially in colder temperatures. It is not necessary to nail the flashing down. (The 7' wide flashing is shown 18" wide for clarity.)

Step 7. Place the Gasket and Top Mounting Bracket on the roof as shown in Figure 13, applying approved sealant (see page 6) generously on both sides of the gasket where indicated. Surround all holes with sealant, especially on the uphill side. Using a drill with a socket adapter, drive the two 5/16" x 4" lag screws (with washers).

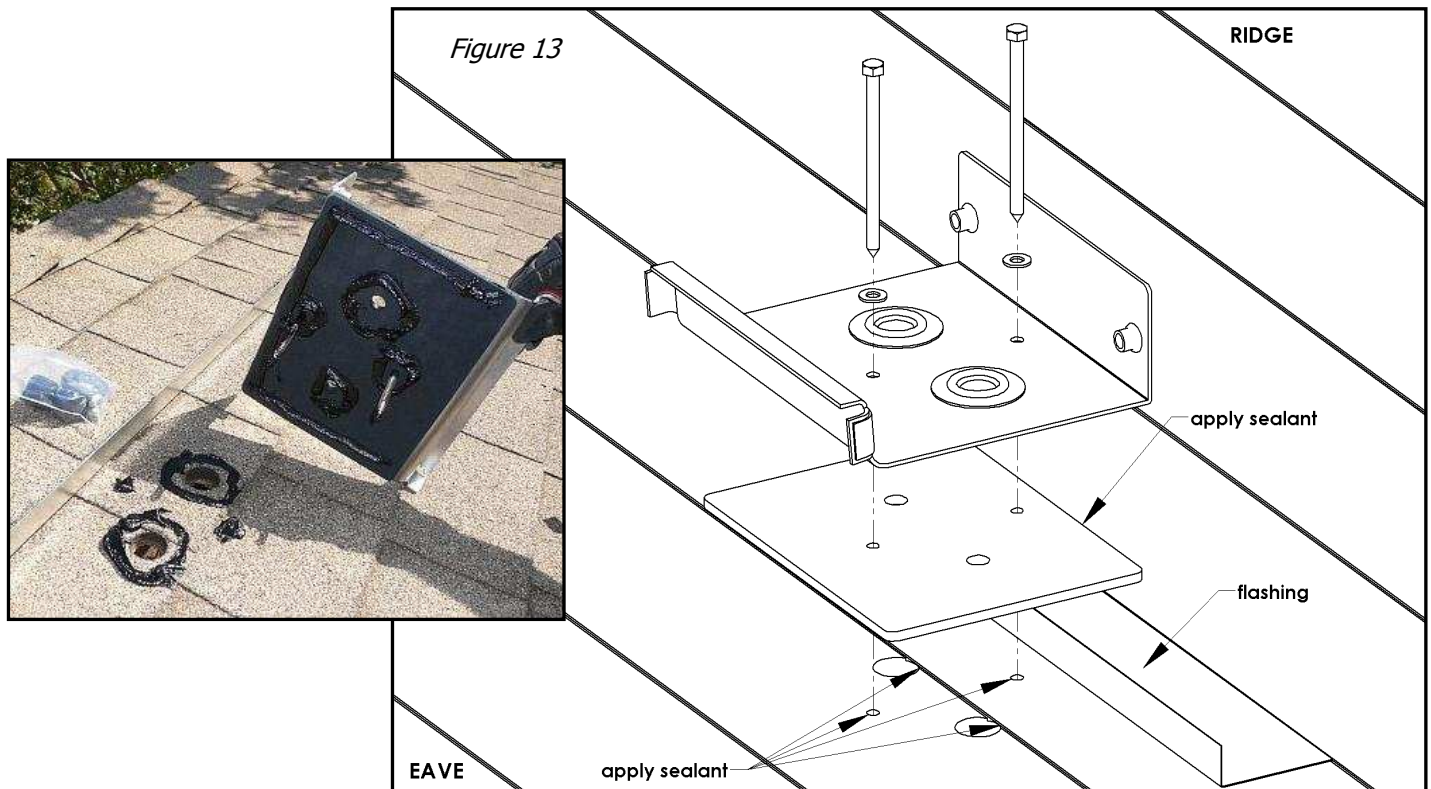
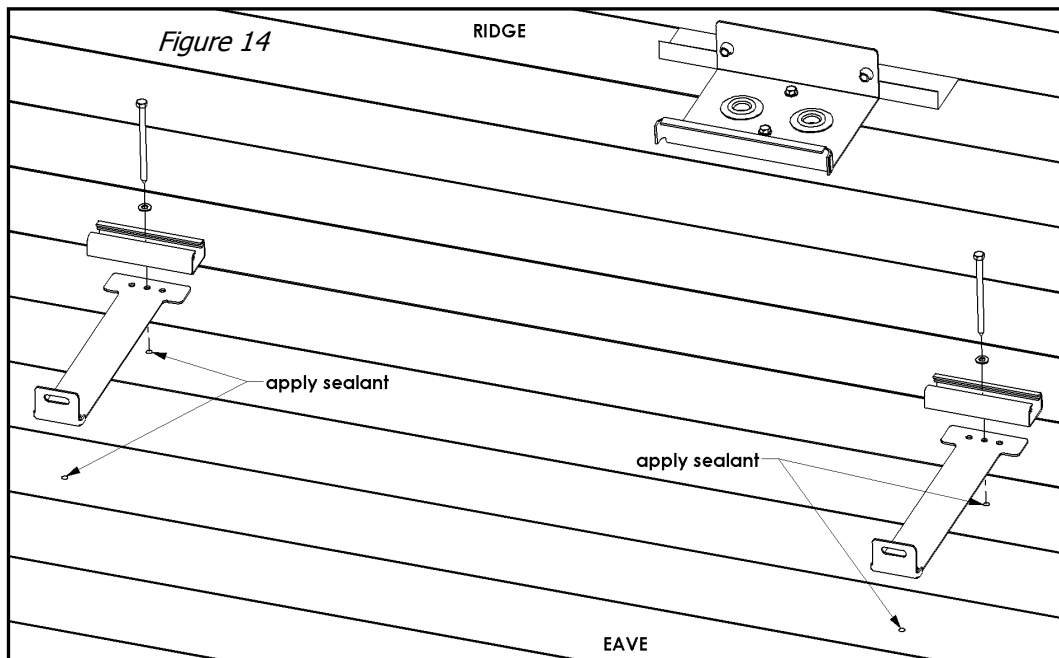


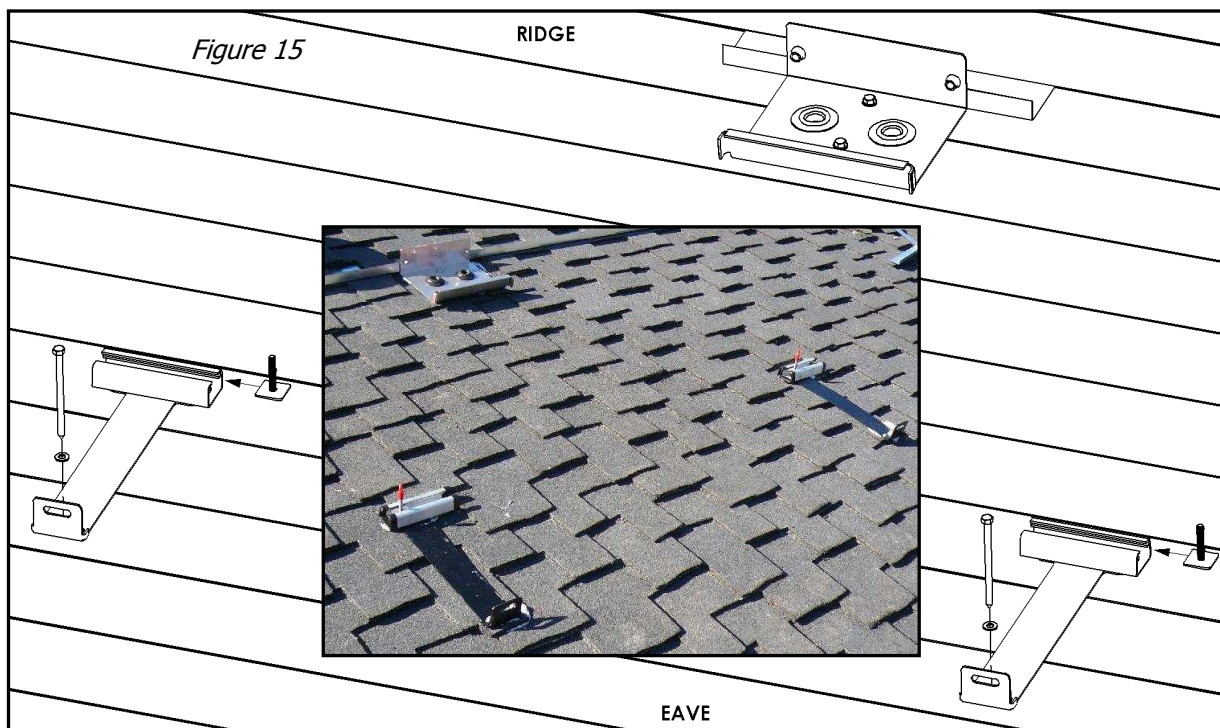
Figure 13



Step 8. Place the Bottom Mounting Brackets and Mounting Struts on the roof as shown in Figure 14, applying sealant to all four holes. Drive the upper two 5/16" x 4" lag screws (with washers) PART WAY, so that the heads are just below the top of the Mounting Strut. Line up the lower two holes, but do not insert the lower lag bolts.

Step 9. Place the black plastic water panel on the roof, resting it against the Upper Mounting Bracket and Mounting Struts. Check the fit. Set the panel aside, and place the glazing assembly onto the Mounting Brackets. The lower extrusion should rest on the small tabs of the Lower Mounting Brackets. Check the clearance at the four bolt holes in the extrusions. If you can't see the lower holes, then the brackets will have to be moved and the off-center holes used to locate the Lower Mounting Brackets. Set the glazing assembly aside.

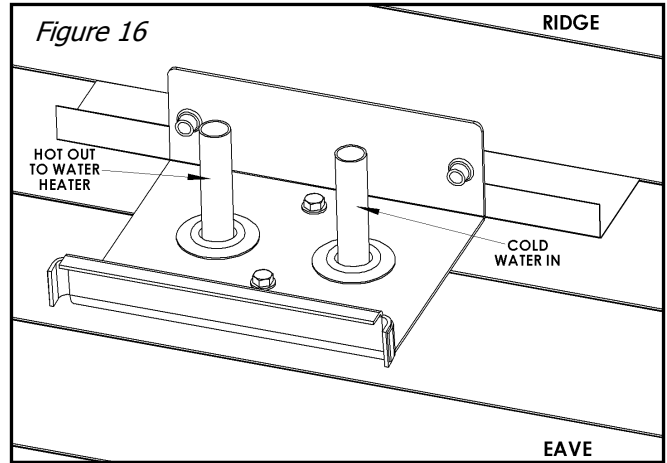
Step 10. Drive the remaining two 5/16" x 4" lag bolts (with washers) into the lower holes. Finish driving the lag bolts from Step 8. Slide the Strut Washers to the center of the Mounting Struts as shown in Figure 15.



Step 11. Run the supply and return lines from the Valve Package to the Upper Mounting Plate using either 3/4" PEX pipe or 3/4" copper pipe. PEX PIPE IS RECOMMENDED BY HARPIRIS ENERGY FOR ALL LOCATIONS.

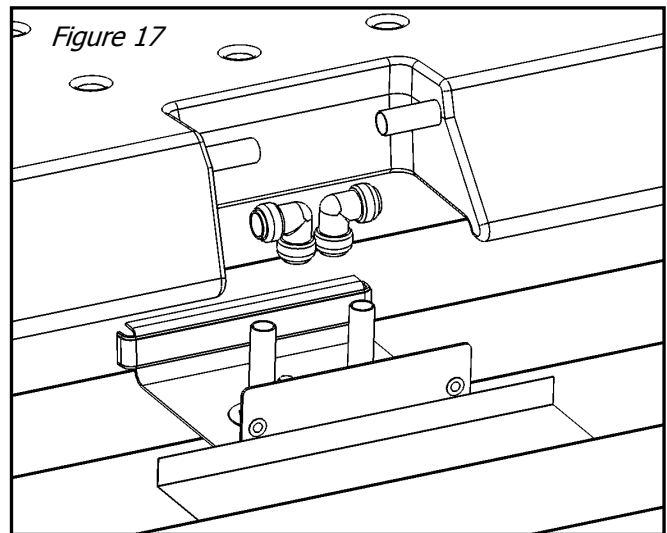
THE PIPES MUST BE RUN AS SHOWN IN FIGURE 11. Using the correct stubs on the panel is important.

Push the pipes through the gasket and grommets, covering the end of the pipe with tape to minimize clean-up. The grommets should become inverted when the pipes pass through. Leave enough slack to pull the tubes 12" out of the bracket.



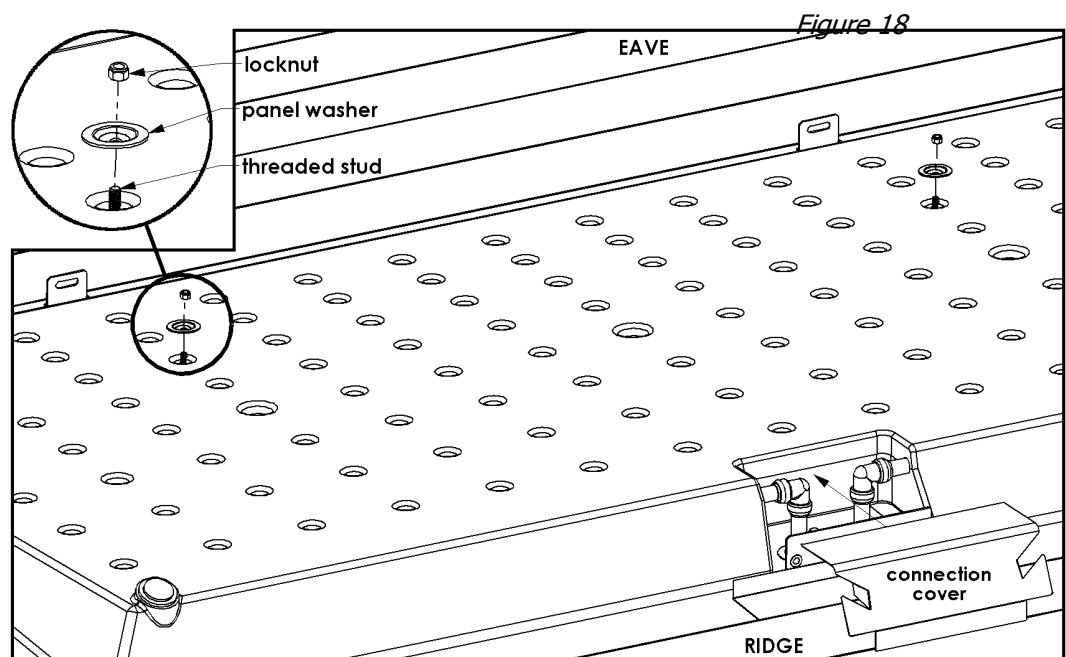
Step 12. Move the Panel into place, making sure to pass the threaded studs through the appropriate panel holes.

The pipe must be installed 1-1/16" deep. There is often a light stop at about 3/4" deep, but you must push the pipe at least 1" deep to get a seal. Remove the white plastic. If using PEX, insert it into the end of the PEX pipe. If using copper, do not use the insert. Remove it for copper pipe. We recommend installing the Sharkbite elbows on the supply and return lines first, and then onto the copper stubs. Raising the upper edge of the panel by 12" will make it easier to bend the tubing enough to connect to the copper stubs on the panel. Keep the orange plastic horseshoe-shaped tool in case the fitting need to be removed during repairs or re-roofing.



Step 13. Install the Connection Cover as shown in Figure 18. Remove the vinyl thread covers on the threaded studs and install the Panel Washers and Locknuts. DO NOT DRIVE THE LOCKNUTS AND PANEL WASHER INTO THE PANEL.

Fill the panel with potable water using a garden hose. DO NOT USE ANTI-FREEZE. Install the 1" NPT fill port plugs with Teflon tape.



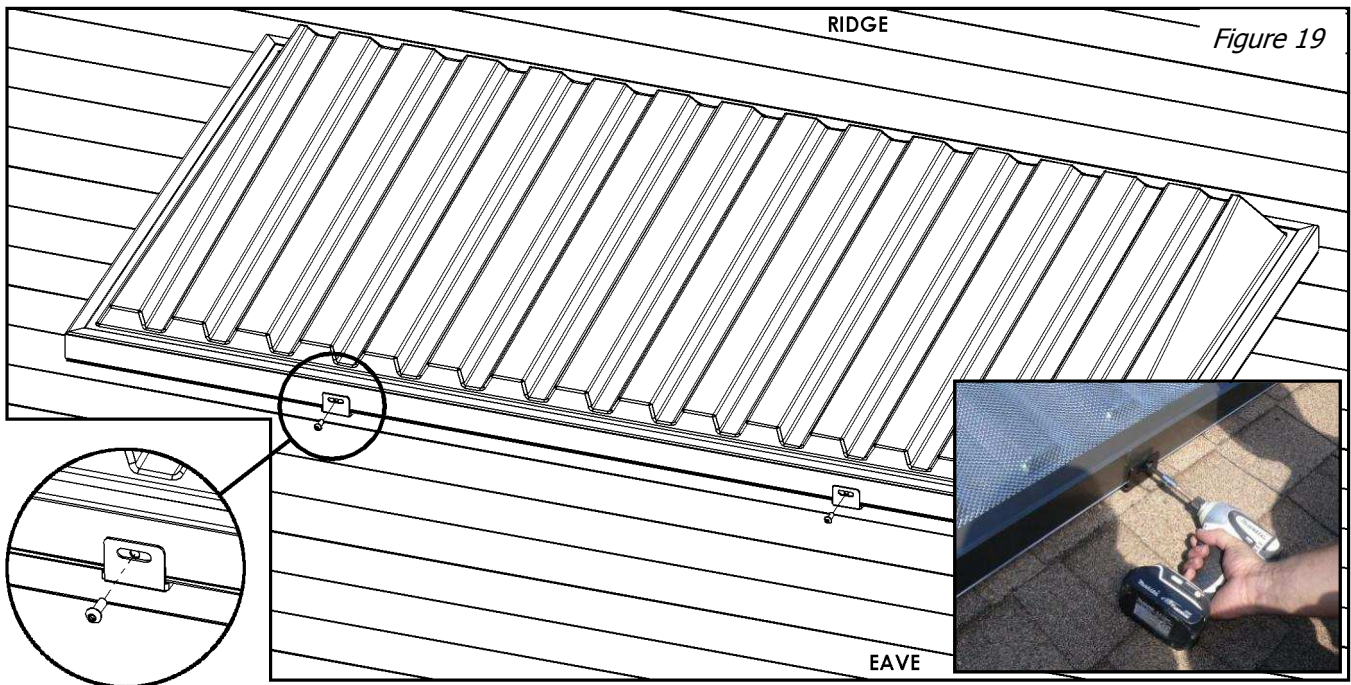


Figure 19

Step 14. Move the Glazing Assembly into place. As shown in Figure 19, install the two 3/8"-16 x 1" button head cap screws by passing them through the slots and into the threaded inserts in the lower aluminum extrusion.

Step 15. As shown in Figure 20, install the two 3/8"-16 x 2-1/4" button head cap screws by passing them through the plain holes in the top aluminum extrusion and into the threaded inserts in the Upper Mounting Plate. Make sure that the flashing lip is INSIDE the extrusion. For thick shingles, you may need to trim the flashing with sheet metal snips to access the holes in the Upper Mounting Bracket.

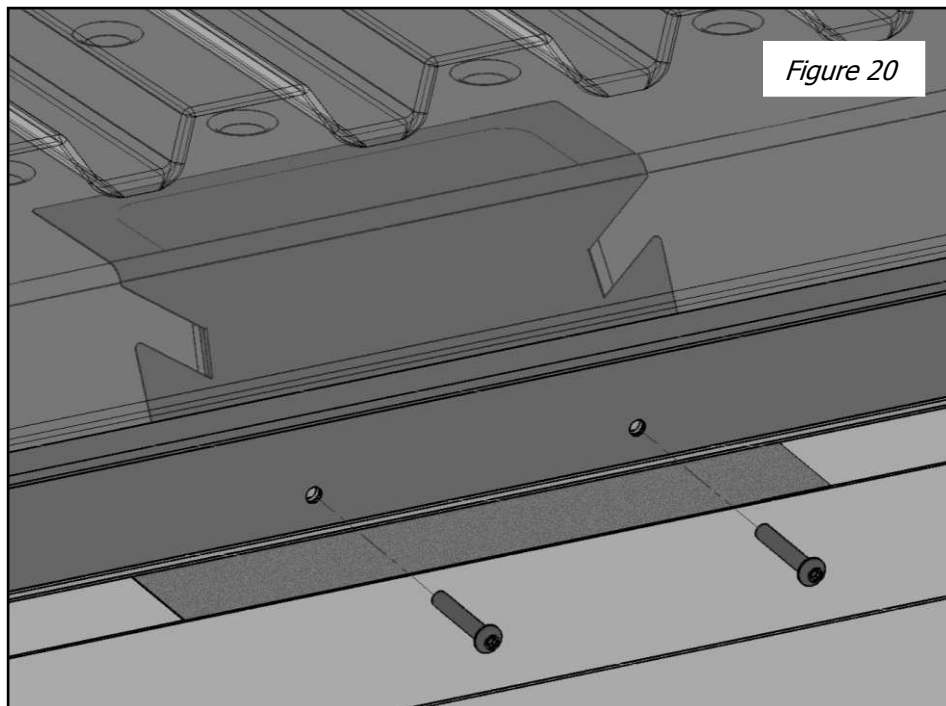


Figure 20

16) SYSTEM PLUMBING INSTRUCTIONS

A. PLUMBING SPECIFICATIONS

A pre-plumbed valve package is supplied with each SunCache system. This valve package meets all SRCC and HARPIS requirements and will save installation time and costs.

The SunCache ICS should be plumbed with PEX pipe and brass fittings and valves. Use of galvanized fittings is prohibited. Piping shall be a 3/4" PEX pipe. If PEX is not allowed by local regulation, 3/4" Type-L continuous soft copper tubing should be used to minimize solder joints in the attic whenever possible. 3/4" PEX IS RECOMMENDED FOR MAXIMUM FREEZE RESISTANCE. Use only lead-free solder (Englehard Silvabrite 100 is recommended). DO NOT use CPVC, PVC or any type of plastic piping other than PEX in the solar loop. The SunCache can produce temperatures that will soften some types of plastic piping.

All roof and attic piping must be installed to slope 1/4" per foot of pipe run to ensure that the pipes will drain when the system is isolated for maintenance.

Figure 21 details the plumbing connection between the SunCache and the conventional water heater. The 2-way plumbing configuration allows either solar pre-heating or 100% conventional water heating, bypassing the SunCache. In Figure 21, a single boiler drain is shown for draining both the SunCache supply and return lines. A hose must be connected whenever the lines are being drained. Hard copper piping and a 2-way ball valve should be used when a permanent drain line is desired.

In plumbing the conventional water heater, use only copper and brass fittings, nipples and unions. Galvanized fittings and di-electric unions may NOT be used. All connections should be hard copper. Water heater flex hose connectors use gaskets that become brittle and compressed over time and may cause leaks.

Tank plumbing must allow isolation of the water heater from the cold water supply line by means of an isolating ball valve (Figure 20 and Figure 21, item 6). A thermostatic mixing valve (also known as a tempering valve) is required. The specified mixing valve shall be Zurn model 34-ZW1017C or similar and shall have an operating range between 95°F and 140°F. Set the mixing valve to operate at 5°F above the water heater setpoint. In some jurisdictions, anti-scald bath fixtures can be used in-lieu of the mixing

valve. (This is typically only an option for new construction.)

All vertical piping from the conventional water heater to the SunCache ICS unit shall be supported at each story at maximum intervals of ten feet (10'). Piping insulation covering the PEX or copper pipe may not be crimped or compressed by the strapping material.

B. INSTALLING WITH A TANKLESS WATER HEATER

Use the plumbing schematic shown in Figure 22 when using a gas tankless water heater, or other applications where the valve package cannot be installed on top of a storage water heater, such as indirect combined radiant systems. When installing the SunCache ICS to preheat water entering a tankless water heater, the piping will have to be tailored to match the various configurations of tankless water heaters. Some models have the connections on the right or left side, while others have them on the bottom. In either situation, the valves and fittings can be assembled as shown in Figure 22. A thermostatic mixing (tempering) valve is required for every tankless installation. NEVER INSTALL SUCACHE AND A TANKLESS WATER HEATER WITHOUT A THERMOSTATIC MIXING VALVE.

C. PLUMBING TWO SUNCACHES

When two SunCache are plumbed together in a single system they must be plumbed in parallel. Each panel must have inlet and outlet at the top, but they can be arranged however necessary on the roof, as long as the piping has the correct slope for drainage.

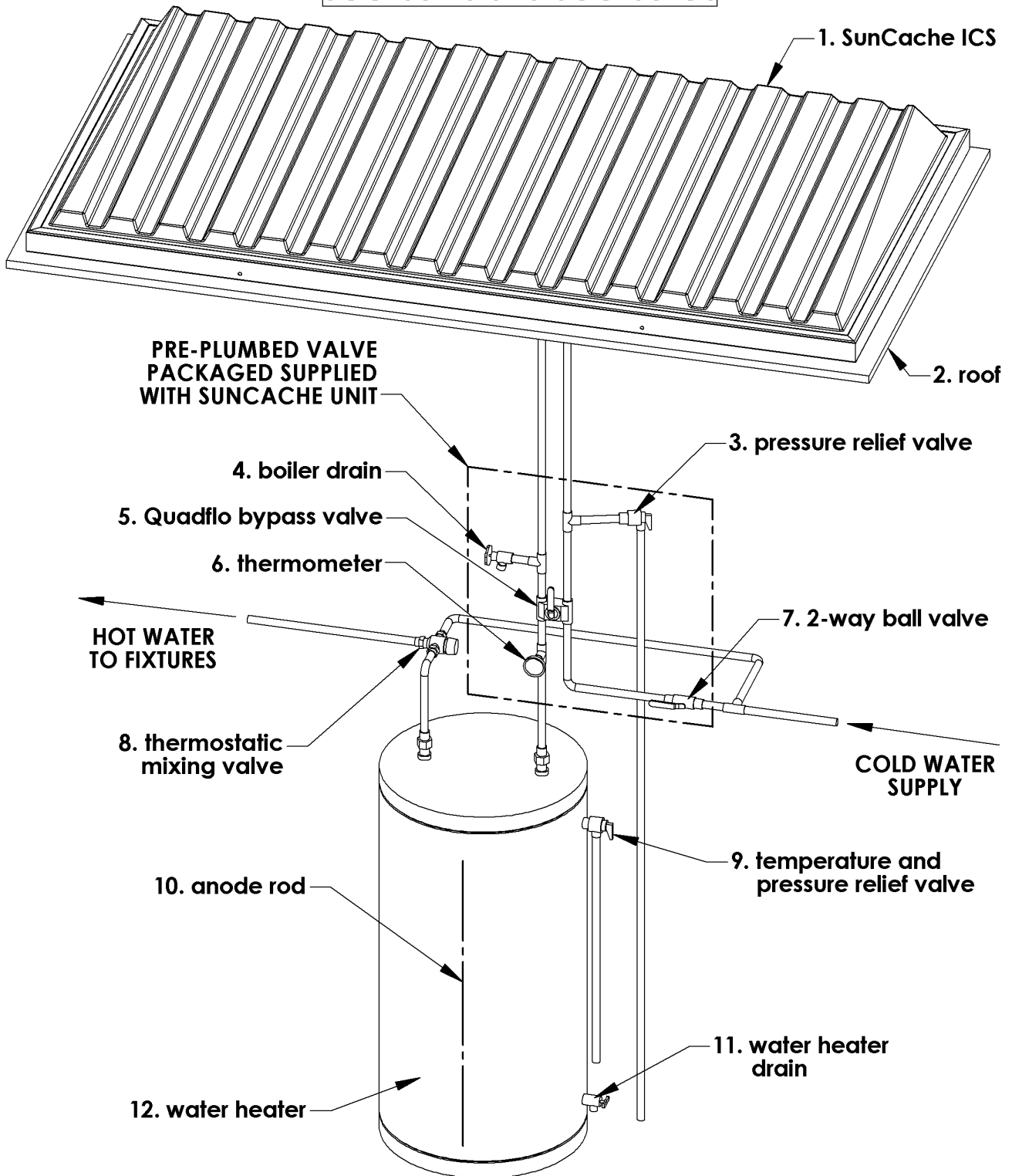
D. INSULATION PROCEDURES

Proper insulation of the tubing to and from the roof prevents heat loss and provides freeze protection. The 3/4" feed and return lines must be covered with pipe insulation of at least 3/4" wall thickness (specified as 7/8" X 3/4" flexible elastomeric thermal insulation, Rubatex "Insultube" or equal). A 1" wall thickness is highly recommended.

For installations that require piping above the roof, all exposed pipe insulation must be coated with two coats of acrylic water based paint such as Rubatex Protective Coating or equal. Inspect the insulation for cracks and signs of shrinkage every five years. Repaint and repair as necessary. **PEX pipe must be protected from UV.**

**Plumbing Schematic:
SCG-50-ES and SCG-50-GS**

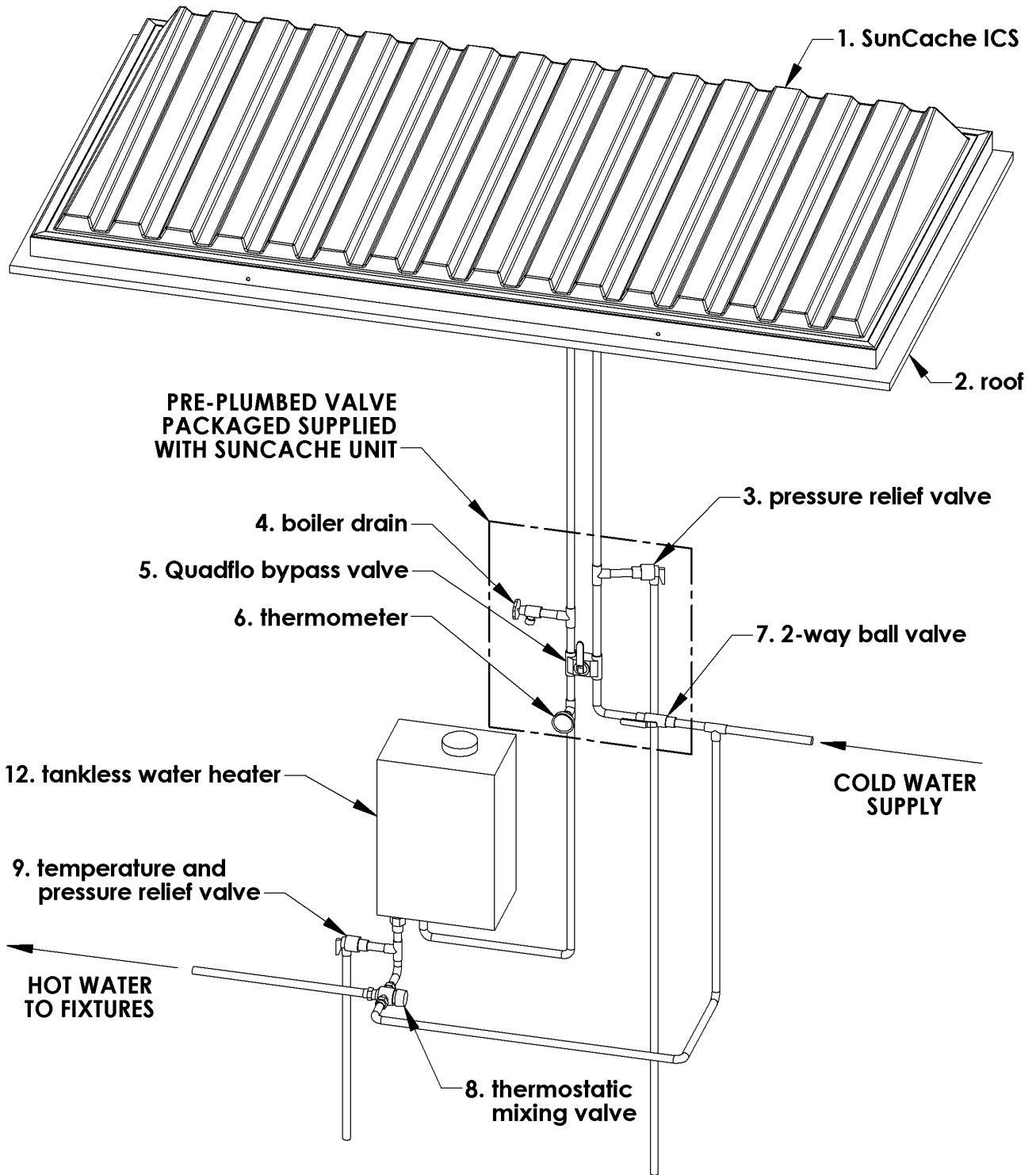
Figure 21



**For double ICS systems SCG-100-ES and SCG-100-GS,
plumbing is same as shown, but with two ICS units in parallel.**

**Plumbing Schematic:
SCG-50-GT**

Figure 22



**For double ICS system SCG-100-GT,
pumping is same as shown, but with two ICS units in parallel.**

The ¾" cold water supply line to the conventional water heater must be insulated with a minimum ½" thick elastomeric thermal insulation (specified as 7/8" X ½" Rubatex "Insultube" or equal) to a minimum distance of five feet (5') back from the storage tank, or to the wall if closer than 5'. The overall performance of the water heating system is enhanced if the hot water supply lines to all the fixtures are well insulated. The insulation wall thickness may vary between ½" to 1" depending upon the local climate. The thicker the insulation wall the better the heat retention in the piping.

If the SunCache is installed in new construction, all hot water service piping in the home should be well insulated. The outside and top of the conventional electric or gas heater also must be insulated with a water heater insulation jacket. The combined R-Value, or insulation value, of the water heater and insulation jacket should be no less than R-17. A foil-faced bubble-pack insulation material as manufactured by Reflectix, or equal, is recommended.

An air gap between the tank jacket and the insulation material should be created. First apply three strips of the material around the complete tank circumference near the top, middle and bottom of the heater. Then attach the insulation blanket to the strips.

Thoroughly insulate the top of the water heater. Fit the insulation snugly around the brass nipples or unions and temperature and pressure relief valve on the top of the water heater. If you have an electric water heater, cut two windows in the insulation around the access plates covering the upper and lower thermostats and heating elements. Insulate the area over the access plates, but make sure that these areas always remain accessible for service or repair as necessary.

If the SunCache is installed in a new home, HARP IRIS specifies that the conventional water heater have a minimum insulation value of R-20. The total insulation value of the water heater and the insulation jacket shall be no less than R-25.

The conventional water heater should not sit directly on the concrete slab or floor. The heater should be placed on a well-insulated pad with a minimum insulation value of R-10. A 2" polystyrene insulation pad such as manufactured by Frost King is recommended.

17) SYSTEM COMPONENTS

When reviewing the primary components in your SunCache ICS System, please refer to Figure 20 and Figure 21.

- 1) The SunCache ICS unit. Integrated solar collector and storage tank.
- 2) Roof. The lines should pass through the roof and connect to the SunCache as shown in install step 13 above.
- 3) Pressure relief valve. Protects the SunCache heat exchanger from pressures above 125 psi.
- 4) Boiler drain. Valve used for draining the lines to and from the SunCache unit.
- 5) Quadflo Valve. This valve controls whether the system is in solar pre-heat or solar bypass mode.
- 6) Thermometer. Indicates temperature of water going to the water heater to confirm SunCache ICS operation.
- 7) 2-Way Ball Valve. This on/off ball valve is **normally open** and allows cold water from the cold supply line to feed the water heater or SunCache.
- 8) Thermostatic Mixing Valve. Also known as tempering or anti-scald valves, this safety component limits the temperature of water leaving the storage tank by blending-in cold water when the water in the tank exceeds the mixing valve setpoint.
- 9) Temperature and Pressure Relief Valve. This emergency valve will open to protect the water heater at temperatures in excess of 212°F or under pressures exceeding 150 PSI.
- 10) Anode Rod. Installed in all glass-lined water heaters to prevent internal tank corrosion and premature failure.
- 11) Water Heater Drain. Allows for draining the back-up water heater.
- 12) Conventional Electric or Gas Storage Water Heater. Tankless water heaters may also be used.

18) SYSTEM START-UP PROCEDURES

Once the SunCache is mounted, plumbed and filled with water in accordance with the drawings and specifications outlined in this manual, commission the system as follows:

A. FILL THE CONVENTIONAL WATER HEATER.

A.1. Set the Quadflo valve (item 5) to the solar bypass position (horizontal, either left or right), as shown in Figure 24.

A.2. Open the cold water supply ball valve (item 7) and fill the conventional water heater. Make sure the tank is completely filled by opening and running a hot water fixture in the home, or by opening the pressure and temperature relief valve if located on the top of the water heater. (Note: on some water heaters the temperature and pressure relief valve is located on the side of the tank near the top.) When the heater is completely filled close the cold water supply ball valve (item 7).

If you have an electric water heater DO NOT turn on the electricity to the heater until the tank is completely filled. It only takes 8 seconds to destroy the heating elements in an electric water heater if they are not completely submerged when the tank is first energized. Be careful.

A.3. The final electrical or gas connection to the conventional water heater must be made by a properly licensed contractor.

B. FILL THE PIPING AND ICS HEAT EXCHANGER.

B.1. If the drain does not have a hard copper line, connect a hose to the boiler drain (item 4) and place the outlet in either a service basin or outside the home. As the supply/return lines and heat exchanger fill with water any air trapped in the system will be purged through valve 4.

B.2. Make sure the 2-way ball valve (item 7) is closed by turning the valve handle to the horizontal position.

B.3. Set the handle of the Quadflo valve (item 5) to the vertical (either up or down) position to send city water to the SunCache and to drain trapped air from the piping and the SunCache heat exchanger.

B.4. Open the cold water supply ball valve (item 7).

B.5. Fill the piping and SunCache heat exchanger. Allow water to flow out through the hose and flush the system for several minutes to eliminate trapped air in the system.

B.6. Close the boiler drain (item 4). The system should now be in solar pre-heat mode as shown in Figure 23.

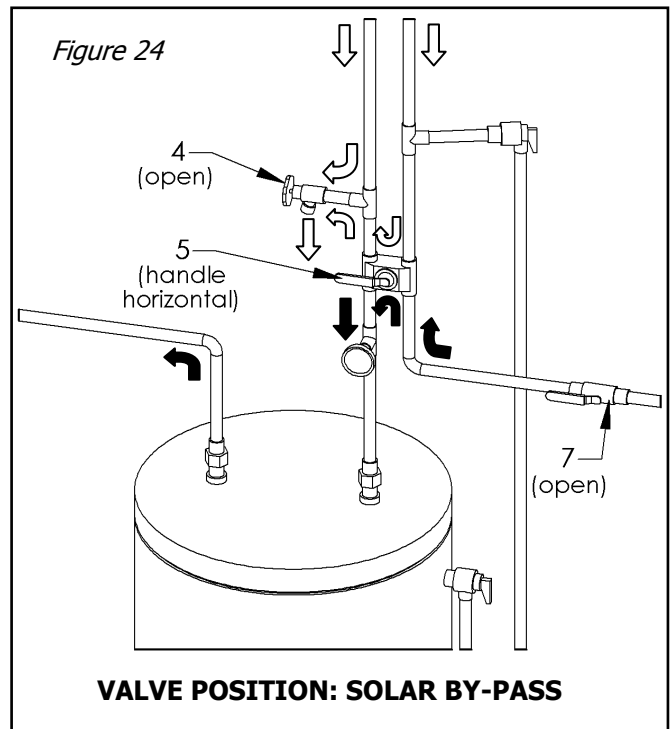
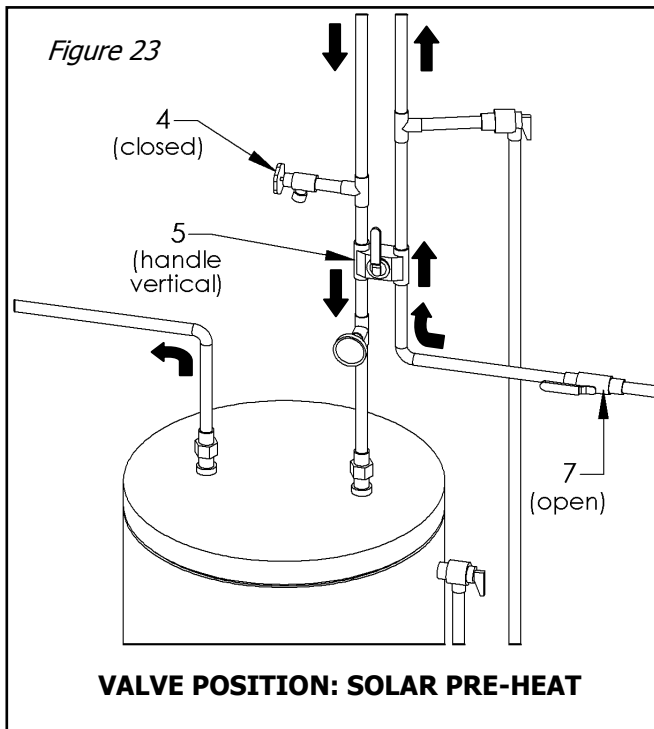
B.7. Inspect the system plumbing for any leaks.

B.8. Open a hot water fixture in the home and run the water until the water runs clear and any trapped air has been eliminated.

B.9. The thermostat on the electric or gas water heater should be set no higher than 120 degrees. Use the "low" or "warm" setting if the thermostat is not calibrated in degrees.

19) VERIFYING SOLAR ENERGY COLLECTION

Using the thermometer, it is easy to verify that the SunCache ICS working and delivering solar energy by preheating the water entering the water heater. On a day with sunny skies, avoid using hot water for at least three hours. (If that is not possible, switch the Quadflo valve to the bypass (horizontal) position for at least 3 hours.) If not already in the bypass (horizontal) position, switch the Quadflo valve to bypass. Open a hot water sink faucet completely. Wait at least one minute and read the thermometer. That is the temperature of the entering cold water. Close the sink tap. Switch the Quadflo valve to the solar pre-heat (vertical) position. Have someone open the hot water sink faucet completely while observing the thermometer. If the system is working properly, the thermometer will rise. How much it rises depends on the flow rate, solar conditions, and the length of time since the last draw through the SunCache ICS.



**20) COLD WEATHER SHUTDOWN PROCEDURES:
DRAINING THE SUPPLY AND RETURN LINES**

If copper tubing is used for the ICS supply and return lines, they must be drained BEFORE cold weather conditions that meet or exceed the SunCache's freeze tolerance limit. IT IS NOT NECESSARY TO DRAIN PEX LINES OR THE SUNCACHE PANEL.

Drain the unit as follows:

- A. Set the Quadflo valve (item 5) to bypass (handle horizontal, either left or right) the SunCache ICS as shown in Figure 24.
- B. If the boiler drain does not have a hard copper line, connect a garden hose to the boiler drain and place the outlet in either a service basin or outside the home. **BE CAREFUL.** The water being drained from the lines may be extremely hot. After the unit and piping are drained, close both boiler drains and replace the protective brass hose caps.
- C. Open the boiler drain (item 4) to drain the water from both lines to and from the SunCache.
- D. Only close the boiler drain after water has stopped draining out of it. For maximum system security, you may choose to leave the drain open, but be sure to close it before refilling the lines.

When refilling the unit, follow the appropriate steps outlined in Section 6 (System Start-Up) above.

NOTE TO THE CONTRACTOR: IT IS AN SRCC CERTIFICATION REQUIREMENT THAT A CONSPICUOUSLY PLACED LABEL EXPLAINING HOW THE SUNCACHE IS PROTECTED FROM FREEZING AND WHAT ACTIONS THE HOMEOWNER SHOULD TAKE SHALL BE ATTACHED TO THE WATER HEATER IN A PLAINLY VISIBLE LOCATION. FOR SYSTEMS LIKE THE SUNCACHE WHICH RELY ON MANUAL INTERVENTION FOR FREEZE PROTECTION, THIS LABEL SHALL INDICATE THE MINIMUM AMBIENT TEMPERATURE BELOW WHICH HOMEOWNER ACTION IS REQUIRED. THE LABEL MUST INDICATE THE BYPASS AND DRAINING PROCEDURES OUTLINED IN SECTIONS 6 AND 7 OF THIS MANUAL. **A LAMINATED LABEL IS PROVIDED WITH THE SUNCACHE FOR THIS PURPOSE.** IF ANY DEVIATIONS ARE MADE FROM THE PROCEDURE DESCRIBED IN THIS DOCUMENT, IT IS THE RESPONSIBILITY OF THE INSTALLER TO PROVIDE A CORRECT LABEL.

ADDITIONAL LABELS FOR COLD-IN ISOLATION VALVE AND HEAT EXCHANGER SPECIFICATIONS ARE PROVIDED FOR SPECIFIC COMPONENTS IN ACCORDANCE WITH SRCC REQUIREMENTS.

21) OVERHEAT PROTECTION

The SunCache ICS has a distinct advantage over other types of solar water heating systems relative to stagnation conditions. If hot water is not drawn from the unit for extended periods, the stored heat in the panel will radiate heat back to the atmosphere during the late night and early morning hours. This process naturally cools the unit and prevents system overheating.

22) ROUTINE MAINTENANCE PROCEDURES

A. After filling the water containment panel in step 4 of the installation, the panel will lose very little water over the system's lifetime. However, the water level should be checked every 5 years and the topped off with potable water. Use PTFE pipe tape when reinstalling the plugs in the fill ports.

B. Check any exterior exposed pipe insulation annually. Repaint as necessary to prevent cracking and shrinkage. Repair any exposed areas immediately.

C. Check the system ball valve placement occasionally to make sure the valves are properly positioned.

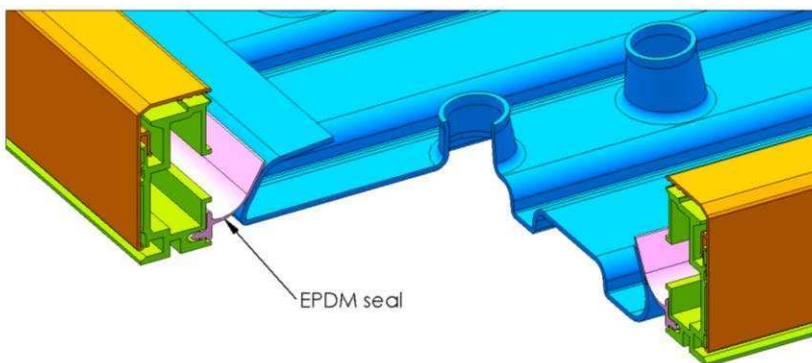
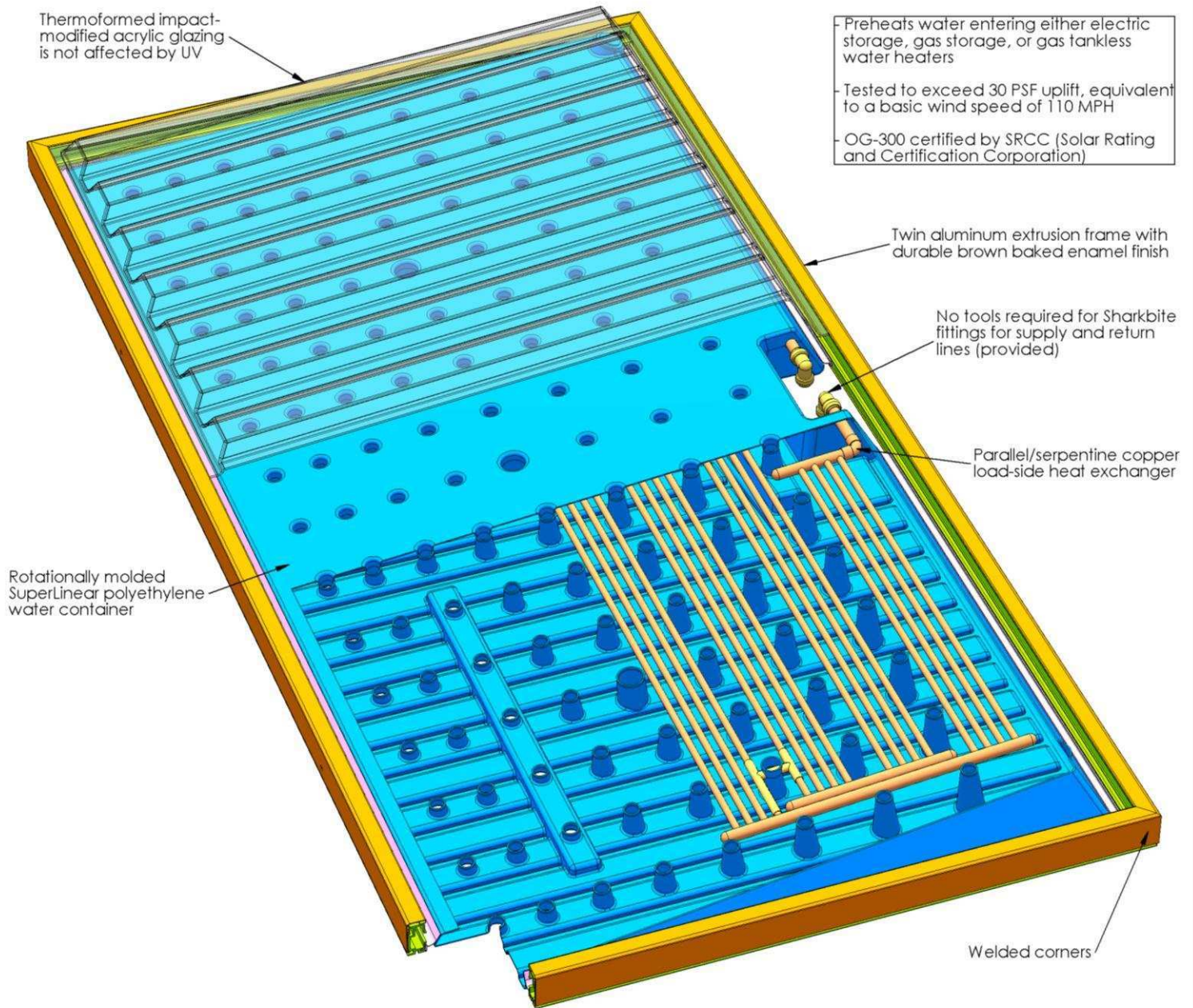
D. In rare cases, it may be required to drain the water containment panel, such as for moving the unit during re-roofing. To drain the panel, open the glazing and remove the fill ports. Connect a 6' flexible tube to a 4-5' long 1/2" hard copper tube. Guide the copper tube as far down into the panel as possible and siphon the water out of the panel.

23) ESTIMATED COMPONENT LIFE

You can expect a long life from the primary components in your SunCache ICS solar water heating system. The SunCache unit has a design life of 15-20 years. Very high panel temperature may adversely impact the life of the panel. The primary determinant of component longevity is the average annual system temperature. Very high finished tank temperatures will adversely impact the life of all water heaters. The conventional water heater should last between 8 and 15 years.

WWW.HARPIRIS.COM

PLEASE VISIT OUR WEB SITE FOR NEW PRODUCT UPDATES, ANSWERS TO FREQUENTLY ASKED QUESTIONS AND USEFUL INFORMATION ABOUT SOLAR WATER HEATING SYSTEMS.



NOT SHOWN:

- Pre-assembled valve package with all required plumbing components (except tempering valve)
- Stainless steel quick-install mounting brackets
- Includes all required fasteners (stainless steel)
- Steel drill templates make locating holes easy

SUNCACHE DIMENSIONS, WEIGHTS, AND ENGINEERING SPECIFICATIONS

Harpis System Model No.	SRCC OG-300 Certification No.	Backup Water Heater Type	Fluid capacity U.S. Gallons	Dry Weight Lbs	Wet Weight Lbs	Length Inches	Width Inches	Depth Inches	Gross Area Sq Ft	Net Aperture Sq Ft	Rated Internal Working Pressure PSI @ 200F	Inlet and Outlet Piping, inches
SCG-50-ES	300-2007-007A	Electric storage	50	112	520	100	51	8	35.4	31.7	120	3/4
SCG-50-GS	300-2008-009A	Gas storage										
SCG-50-GT	300-2008-010A	Gas tankless										

The solar water heating system shall be of the integral collector storage (ICS) type, and shall require no pumps, controls, or parasitic energy consumption for its normal operation. The ICS unit shall be the Harpiris Energy SunCache ICS model SCG-50. The SunCache ICS unit shall be tested in conformance with SRCC Standard TM-1 by an independent testing laboratory, certified by the SRCC under system standard OG-300, and also by the Florida Solar Energy Center (FSEC).

GENERAL The dimensions of the SunCache ICS shall be 100 inches in length, 51 inches in width, and 7 ¼ inches total depth from the roof surface to the top of the glazing. The SunCache ICS shall combine the collector and storage tank as one unit. All fasteners shall be stainless steel (alloy 304). Installation kits containing all necessary mounting hardware and fasteners must be used. Kits are available for conventional composite shingle roofs, flat tile roofs, or atticless composite shingle roofs. A pre-assembled valve package with all required plumbing components (except the thermostatic mixing valve) and Sharkbite™ fittings for tool-free and quick-release supply and return line connections are included.

WATER CONTAINMENT PANEL The water containment panel shall be not less than 35 lb of SuperLinear™ polyethylene, and be rated at a nominal capacity of 50 U.S. gallons. The color is black with integral ultraviolet inhibitors.

HEAT EXCHANGER The heat exchanger shall be of 3/8" type M and 3/4" type L copper tubing (alloy 122, NSF-61 rated for potable water use). The rated internal working pressure shall be 120 PSIG at 200°F. All internal manifold braze joints shall be joined utilizing a copper phosphorous brazing alloy with no less than 15% silver content and conforming to the American Welding Society's BCuP-5 classification.

GLAZING The glazing shall be one sheet of thermoformed impact-modified acrylic. The thickness of the sheet shall be 0.090" before thermoforming. The glazing shall be replaceable.

FRAME The frame shall be a double aluminum extrusion (alloy 6063-T6), with an architectural dark bronze baked enamel finish with welded corners. The seal will be extruded EPDM with a wiper design to create a semi-sealed air gap between the panel and the ambient.

INSTALLATION HARDWARE The installation hardware shall be 10 and 12 and gauge 304 stainless steel.

WIND UPLIFT The installation hardware, frame and glazing shall withstand at least 30 PSF of uplift pressure (corresponding to 110 mph wind speed) without damage or significant deflection.

DOUBLE UNIT GLAZED SUNCACHE SYSTEMS ARE ALSO OG-300 CERTIFIED BY SRCC

SCG-100-ES	300-2007-007B	Electric storage
SCG-100-GS	300-2008-009B	Gas storage
SCG-100-GT	300-2008-010B	Gas tankless



PRODUCT WARRANTY STATEMENT

SUNCACHE SCG-50 ICS

TEN YEAR WARRANTY

Under conditions of normal use and service Harpiris Energy (HARPIRIS) SunCache ICS units are warranted to the original or subsequent users for a period of ten (10) years from the date of sale. HARPIRIS' liability under this warranty shall be limited to repairing or replacing at HARPIRIS' option, without charge, F.O.B. HARPIRIS' factory or an authorized HARPIRIS distributor or service station, the SunCache ICS unit. HARPIRIS will not be liable for any costs of transportation, inspection, removal, reinstallation, or any other labor or freight charges that may arise in connection with a warranty claim except as expressly delineated in this warranty statement.

FIELD LABOR

During the first two (2) years of warranty coverage HARPIRIS will reimburse up to \$100 of field labor.

FREIGHT AND SHIPPING EXPENSES

During the first year of warranty coverage HARPIRIS will pay the shipping costs for the new or repaired SunCache ICS (or replacement parts) between HARPIRIS and the nearest local distributor, dealer, or authorized service center. After the first year freight and packing costs are the responsibility of the owner and are not covered under this warranty.

FREEZE WARRANTY TERRITORY

The SunCache ICS collector is warranted against freeze breakage only when installed in the territory shown in the map below.



THIS WARRANTY WILL NOT APPLY

This warranty does not apply to conditions resulting from a failed component or part that is not part of the SunCache ICS unit; to freeze damage outside the territory shown above; to conditions resulting from misuse, abuse, neglect, accident, or alteration; to minor discoloration of the collector framewall or

August 6, 2009

absorber plate over time; to glazing breakage; to conditions resulting from the introduction of harmful chemicals or liquids other than potable water; to connection piping; to periods of stagnation in excess of 90 days; to excessive line pressure; to erosion corrosion of the copper tubing resulting from excessive flow rates; to improper plumbing configurations that do not conform to HARPIRIS' manifolding requirements; to clouding or similar occurrence resulting from the normal intrusion of moisture into the box; to conditions resulting from floods, earthquakes, winds, fire, lightning, or circumstances beyond HARPIRIS' control; to installation methods that do not conform to relevant national, state or local codes and ordinances, good industry practices or applicable HARPIRIS manuals, diagrams, technical bulletins or written installation instructions; and to applications other than medium temperature (110 to 160°F) domestic water heating. If the SunCache ICS is purchased outside the continental United States certain conditions of this warranty may not apply. Please contact your local HARPIRIS distributor.

HOW TO MAKE A CLAIM

To obtain service under this warranty, the defective product must be returned to the distributor or dealer of HARPIRIS products nearest you, an authorized HARPIRIS service center, or HARPIRIS directly. Each claim must be accompanied by documentation indicating the homeowner's name, address, phone number, date of installation, date of failure, reason for failure, product model and serial numbers, and the installation contractor's name and phone number. If you have questions regarding this warranty contact your installation contractor or HARPIRIS at (530) 220-7000.

LIMITED WARRANTY

EXCEPT AS EXPRESSLY PROVIDED HEREIN, THE SUNCACHE ICS UNIT IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR ANY WARRANTY OR NON-INFRINGEMENT. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

LIMITATIONS OF REMEDIES

IN NO EVENT WILL HARPIRIS BE LIABLE TO YOU FOR ANY DAMAGES, INCLUDING ANY LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES, ARISING OUT OF THE USE OR INABILITY TO USE THE SUNCACHE ICS, OR FOR ANY CLAIM BY ANY OTHER PARTY. SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

EXCLUSIVE AGREEMENT

THE WARRANTY CONTAINED HEREIN CONSTITUTES THE ENTIRE, COMPLETE, FINAL AND EXCLUSIVE AGREEMENT, AND SUPERSEDES ANY PROPOSAL OR AGREEMENT ORAL OR WRITTEN, AND ANY OTHER COMMUNICATIONS, BETWEEN HARPIRIS AND THE BUYER WITH RESPECT TO THE SUBJECT MATTER HEREOF.

FOR SUNCACHE SYSTEMS INSTALLED AS PART OF THE DEG / ARB ICAT DEMONSTRATION PROJECT, WARRANTY IS MODIFIED WITH THE FOLLOWING TERMS:


- **Parts coverage period = two (2) years**
- **Field labor coverage period = one (1) year**
- **Freight coverage period = one (1) year**

August 6, 2009

Name, Address, and Phone Number of Installation Company

Name, Address, and Phone Number of Service Company (if different from above)

INSTALLER MUST CHECK APPROPRIATE SYSTEM MODEL BOX BELOW

	This product certified by: Solar Rating and Certification Corporation 1679 Clearlake Road Cocoa, FL 32922 (321)638-1537 www.solar-rating.org	Davis Energy Group 123 C Street Davis, CA 95616 System Serial No. _____ SRCC Document OG-300
	System Model: <input type="checkbox"/> SCU-50-ES <input type="checkbox"/> SCU-50-GS <input type="checkbox"/> SCU-50-GTL <input type="checkbox"/> SCG-50-ES <input type="checkbox"/> SCG-100-ES <input type="checkbox"/> SCG-50-GS <input type="checkbox"/> SCG-100-GS <input type="checkbox"/> SCG-50-GTL <input type="checkbox"/> SCG-100-GTL	SRCC Certification Number: 300-2004-007A 300-2008-007A 300-2008-008A 300-2007-007A 300-2007-007B 300-2008-009A 300-2008-009B 300-2008-010A 300-2008-010B
The installed system is checked above.		



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