SunEarth Inc.

SolaRay AC

SRCC OG-300 Certified Solar Water Heating System

Type: AC Circulating Pump and Differential Control

Installation, Operation and Maintenance Manual

SOLARAY^{AC}
DOMESTIC SOLAR WATER HEATER SYSTEM

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

The SolaRay domestic 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 SolaRay system is intended to be executed by properly licensed and experienced professional contractors in accordance with SRCC Standard OG-300, "Operating Guidelines and Minimum Standards For Certifying", and shall 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 SunEarth by the SRCC. It may not be used for any commercial purpose without the prior written consent of SunEarth. SunEarth must approve any deviation from the materials and methods described in this manual in writing.

SunEarth SolaRay solar water heating systems can be protected against freeze damage to temperatures as low as -60°F (-51°C). This system should not be installed in any area that has experienced ambient air temperatures below -60°F. Use Table 4, Section 4 of this manual to determine the required concentration of propylene glycol and distilled water to provide adequate freeze protection in your specific climate.

Dow Chemical "Dowfrost HD" propylene glycol heat transfer fluid shall be used in this system as the primary freeze protection agent. Unauthorized fluid substitutions can result in a threat to health, welfare and safety and may cause the system piping to freeze.

All component warranties, express or implied, are voided if uninhibited glycol, potable or distilled water are substituted for the specified heat transfer fluid described in this manual, or if the heat transfer fluid is not maintained in accordance with Dow Chemical's specific instructions.

Freeze tolerance limits are based upon an assumed set of environmental conditions. Extended periods of cold weather, including ambient air temperatures above the specified limit may cause freezing in exposed parts of the system. It is the owner's responsibility to protect the system in accordance with SunEarth's instructions if the ambient air temperature approaches the specified freeze tolerance limit.

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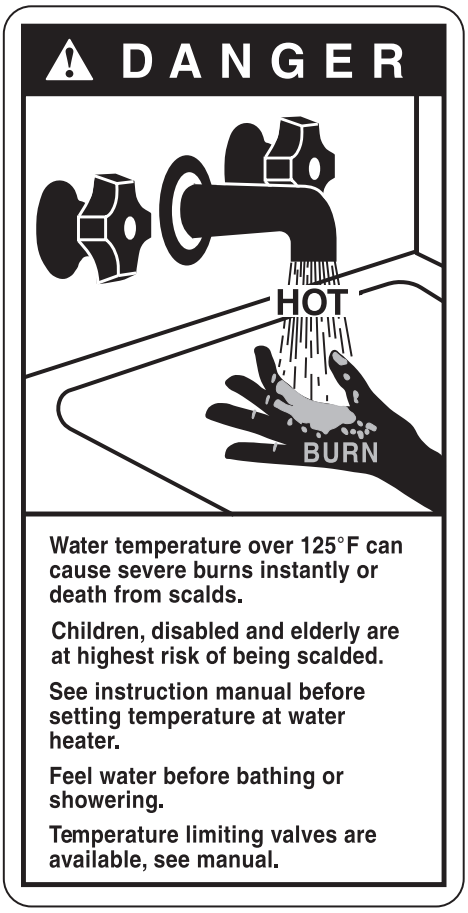
IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.

⚠ DANGER!

WATER TEMPERATURE SETTING

Safety and energy conservation are factors to be considered when selecting the water temperature setting of water heater's thermostat. Water temperatures above 125°F can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined on the label pictured below.



⚠DANGER: Burns from Hot Water and Steam - Use extreme care when opening relief valves, charging closed loop, and filling storage tank.

The electrical element booster thermostat has been factory set at 50°C (120°F) to reduce the risk of scald injury. Adjusting the thermostat to a higher setting is not recommended. Hotter water increases the potential for Hot Water Scalds.

Time/Temperature Relationship in Scalds

Temperature	Time To Produce a Serious Burn
120°F	More than 5 minutes
125°F	1½ to 2 minutes
130°F	About 30 seconds
135°F	About 10 seconds
140°F	Less than 5 seconds
145°F	Less than 3 seconds
150°F	About 1½ seconds
155°F	About 1 second

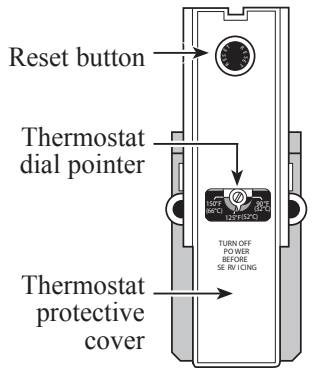
Table courtesy of Shriners Burn Institute

The chart shown above may be used as a guide in determining the proper water temperature for your home.

⚠DANGER: Households with small children, disabled, or elderly persons may require a 120°F or lower thermostat setting to prevent contact with "HOT" water.

NOTICE: Mixing valves should be installed to reduce the point of use water temperature by mixing hot and cold water in branch water lines. Contact a licensed installer or the local plumbing authority for further information.

The temperature of the water in the water heater can be regulated by setting the temperature dial of the adjustable surface mounted thermostat located behind the jacket access panel.



This thermostat controls the water heater's heating element only. (A separate thermostat should be utilized in monitoring the temperature from the collector).

To comply with safety regulations the thermostat is factory set at 120° F or less where local codes require.

⚠DANGER: Hotter water increases the potential for Hot Water SCALDS.

IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.

⚠WARNING!

For your safety, the information in this manual must be followed to minimize the risk of fire or explosion, electric shock, or to prevent property damage, personal injury, or loss of life.

Be sure to read and understand the entire Installation, Operation and Maintenance Manual before attempting to install or operate this water heater. It may save you time and cost. Pay particular attention to the Safety Instructions. Failure to follow these warnings could result in serious bodily injury or death. Should you have problems understanding the instructions in this manual, or have any questions, STOP, and get help from a qualified service technician, or the local utility.

FOR INSTALLATIONS IN THE STATE OF CALIFORNIA

California Law requires that residential water heaters must be braced, anchored or strapped to resist falling or horizontal displacement due to earthquake motions. For residential water heaters up to 52 gallon capacity, a brochure with generic earthquake bracing instructions can be obtained from: Office of the State Architect, 1102 Q Street, Suite 5100, Sacramento, CA 95814 or you may call 916-445-8100 or ask a water heater dealer.

However, applicable local codes shall govern installation. For residential water heaters of a capacity greater than 52 gallons, consult the local building jurisdiction for acceptable bracing procedures.

SAFETY PRECAUTIONS

Have the installer show you the location of the circuit breaker and how to shut it off if necessary. Turn off the circuit breaker if the water heater has been subjected to overheating, fire, flood, physical damage or if the ECO fails to shut off.

- Read this manual entirely before installing or operating the water heater.
- Use this appliance only for its intended purpose as described in this Installation, Operations and Maintenance Manual
- Be sure your appliance is properly installed in accordance with local codes and the provided installation instructions.
- **Do not** attempt to repair or replace any part of your water heater unless it is specifically recommended in this manual. All other servicing should be referred to your installing contractor or local SunEarth Distributor.

READ AND FOLLOW THIS SAFETY INFORMATION CAREFULLY.

SAVE THESE INSTRUCTIONS

PREFACE

Let us first offer two words of grateful appreciation. Thank You! We sincerely appreciate your business. SunEarth also wishes to say thank you for "going solar". Solar water heating systems help to reduce our nation's dependence on polluting fossil fuels, minimize the greenhouse gas emissions associated with conventional water heating and, very importantly, lower your monthly utility costs.

Established in 1978, SunEarth is a leading U.S. solar equipment manufacturer. Our products include industry standard Empire™ and SunBelt™ solar water heating collectors, CopperHeart™ integral collector storage systems, SunSiphon™ packaged thermosiphon systems, SunBurst™ all copper absorber plates, Solar Strut™ and Rex Rack™ mounting hardware. We also build specialty collectors for unique architectural and building applications. SunEarth SRCC OG-300 certified solar water heating systems are sold by leading solar, plumbing and building contractors throughout the United States.

Your SolaRay solar water heating system has been designed to meet exacting SRCC OG-300 certification requirements. The components found in your system have been selected by your installation contractor for their proven reliability, longevity and performance in your specific region of the country.

SunEarth Inc. maintains a policy of continuous review and improvement to ensure that Solaray systems incorporate any appropriate technological advances. To ensure that products represent the current state of the art in solar water heating Solaray systems are subject to change without notice. Please consult the SunEarth Inc. website at www.sunearth-inc.com for current information and latest manual revisions.

1) INTRODUCTION

Solar water heating systems are climate and site specific appliances. Different types of solar systems are installed around the world in accordance with regional weather and water quality conditions. System performance varies as a function of the household hot water load, including daily showers, laundry and kitchen uses, average ground water and ambient air temperatures, the 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 on the same neighborhood street, will determine how much energy and money your SolaRay system will save on an annual basis.

Your SolaRay solar system is known as a "forced circulation" system because it utilizes a mechanical pump to efficiently circulate the Dow Chemical Dowfrost HD propylene glycol heat transfer fluid (HTF) throughout the system. The HTF protects the collector piping from freezing and inhibits scaling deposits that can reduce performance in "open-loop" systems utilizing potable water as the HTF. Proper application and maintenance of the HTF can protect your Solaray solar water heating system to minus 60° Fahrenheit.

This manual is intended as a basic solar water heating primer. Our goal is to familiarize you with the proper installation, operation, and maintenance of your SolaRay solar system. This system is required to be installed by properly licensed solar or plumbing contractors in accordance with SRCC Standard OG-300 and all applicable national, state and local codes, ordinances and regulations governing solar water heating installations, as well as good trade practices. Failure to follow the procedures and practices described in this manual may void the manufacturer's warranty for specific component parts.

This manual covers installations utilizing one or two SunEarth solar collectors with a single solar storage tank and also two tank systems that include a solar storage tank and supplemental tank type or tankless water heater. For simplicity, the singular form will be used throughout this manual when referring to all of these components and system permutations. Frequent reference is made throughout this manual to specific component parts. The placement of each component can be seen in system schematic figures 15 and 16. A description of each component and its function is found in Section 10.

2) SYSTEM DESCRIPTION AND OPERATIONAL PRINCIPLE

The key components in the SolaRay solar water heating system include the SunEarth solar collector, solar storage tank with integral heat exchanger, circulation pump, differential temperature controller, expansion tank, pressure gauge, mixing valve and the non-toxic propylene glycol heat transfer fluid (HTF).

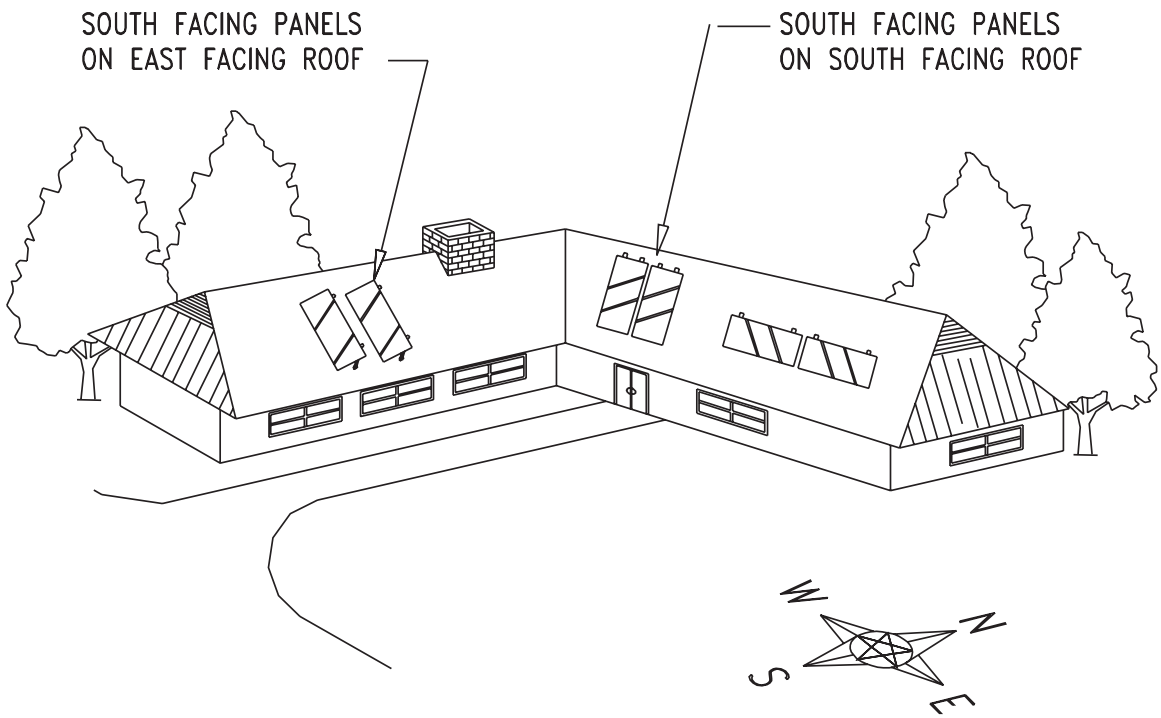


fig. 1 **COLLECTOR ORIENTATION**

The SunEarth solar collector is the heart of the SolaRay system. Simply stated, when the sun is shinning, heat energy is absorbed by the solar collector's all copper absorber plate and transferred to the HTF circulating through the solar collector. The system pump efficiently circulates this heated fluid through the collector piping and integral tank heat exchanger. The heat exchanger consists of a 120' length of copper tubing wrapped around the solar storage tank. As the HTF passes through the heat exchanger the heat in the fluid is transferred by conduction to the potable water in your solar storage tank. As this process is continuously repeated during the average sunny day the temperature in your solar storage tank rises.

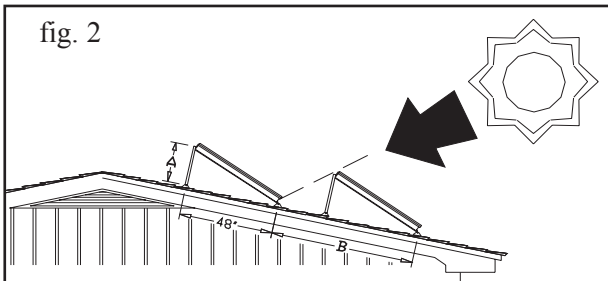
The differential temperature controller is the brain of the system. The controller uses temperature sensors to constantly monitor the temperatures at the collector and at the tank. The controller automatically turns the pump on when useful heat is available at the collector and turns the pump off when there is insufficient solar heat available or the tank has reached maximum temperature.

Both single and double tank Solaray systems are designed to provide two modes of operation. The system will, (1) serve as a preheater to your solar storage tank or back-up water heater, or (2) bypass the solar collector and run 100% on utility energy or conventional fuel. The installation of an optional water heater time switch allows you to control both the frequency and duration of supplemental electric resistance water heating. Supplemental electric heat may not be required for much of the year depending upon your specific requirements, thus providing an effective third mode of operation – 100% solar.

Section Six provides instructions for setting the system for automatic operation in each of these two modes.

The Dowfrost HD HTF protects your SolaRay solar

fig. 2



STAGGERED MOUNT COLLECTOR SPACING

TABLE 1

LATITUDE			25°N		30°N		35°N		40°N		45°N		50°N	
COLL. TILT			35°		40°		45°		50°		55°		60°	
			A	B	A	B	A	B	A	B	A	B	A	B
	FLAT		29	96	33	113	37	145	41	145	44	145	48	145
	5°	1/12	25	83	29	93	33	113	37	132	41	133	44	141
	9°	2/12	22	74	26	82	30	77	34	110	38	115	41	118
	14°	3/12	17	66	22	72	26	82	30	92	34	95	38	98
	18°	4/12	14	61	18	66	22	74	26	82	30	85	34	87
ROOF	23°	5/12	10	58	14	60	18	66	22	72	26	74	30	77
PITCH	27°	6/12	7	58	11	58	15	61	19	66	23	68	27	70
	30°	7/12	4	58	8	58	13	58	17	62	21	65	25	66
	34°	8/12	0	58	5	58	9	58	13	58	17	60	22	62
	37°	9/12	0	58	3	58	7	58	11	58	15	58	19	58
	40°	10/12	0	58	0	58	4	58	8	58	13	58	17	58
	43°	11/12	0	58	0	58	2	58	6	58	10	58	14	58
	45°	12/12	0	58	0	58	0	58	4	58	8	58	13	58
DIMENSIONS A AND B ARE DESIGNATED IN INCHES														

system against freezing. Dowfrost HD can provide reliable freeze protection at temperatures as low as minus 60° Fahrenheit if properly applied and maintained. Use of uninhibited propylene glycol, ethylene glycol, plain water or any mixture of these fluids as the HTF in this system is strictly prohibited.

Propylene glycol can degrade over time. The process of degradation is accelerated in presence of oxygen and/or heat. We strongly encourage you to establish a preventative maintenance schedule with your installation contractor. The HTF pH level must be maintained between 8 and 10 in order to prevent glycol oxidation and corrosion of the collector piping. SunEarth's collector warranty specifically excludes freeze damage for any reason and absorber plate damage resulting from the oxidation of the propylene glycol HTF.

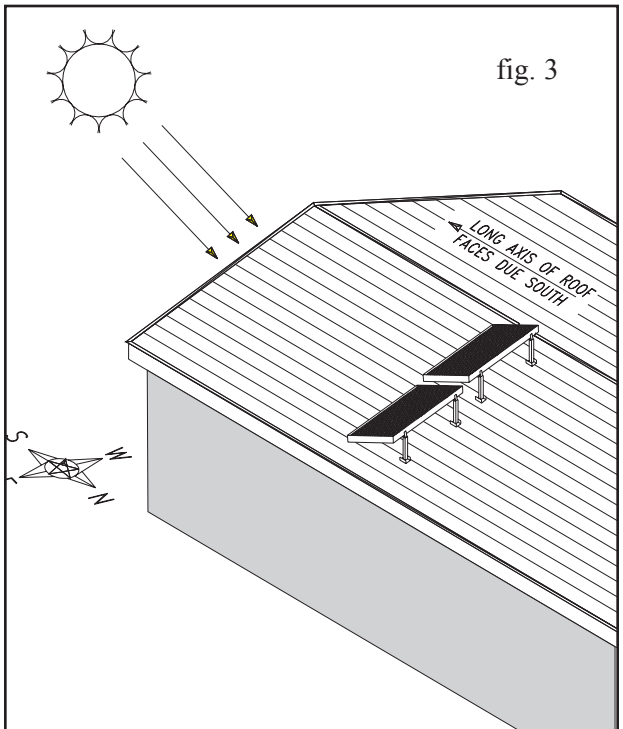
In order to completely protect the integrity of the solar collector and piping, the system is designed to be drained manually if subject to extended periods of disuse or persistent hard freeze conditions below minus 60° Fahrenheit. (See Sections 8.1 and 8.2)

3) INSTALLATION REQUIREMENTS - GENERAL

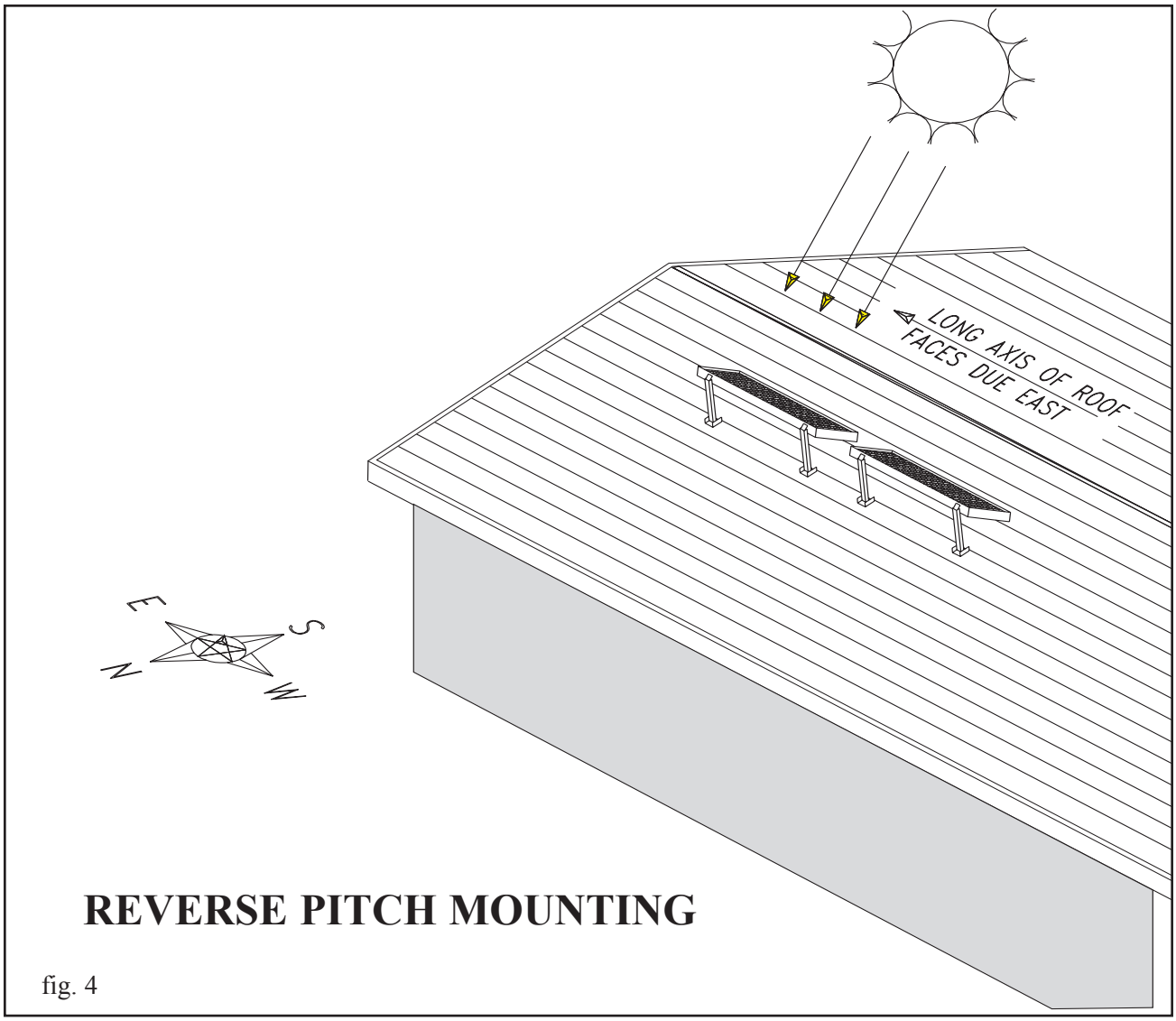
3.1 The contractor shall obtain all required permits and approvals.

3.2 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 the penetration of structural members and fire rated assemblies.

fig. 3



SIDE PITCH MOUNTING



REVERSE PITCH MOUNTING

fig. 4

3.3 The solar collector 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 can be used for solar site analysis. (Solar Pathfinder can be reached at www.solarpathfinder.com)

3.4 Before the installation the contractor shall inspect the condition of the roof and notify the homeowner of any existing roof damage or necessary repairs.

3.5 The homeowner and contractor shall confirm the location of all roof and ground mounted components in advance of the installation.

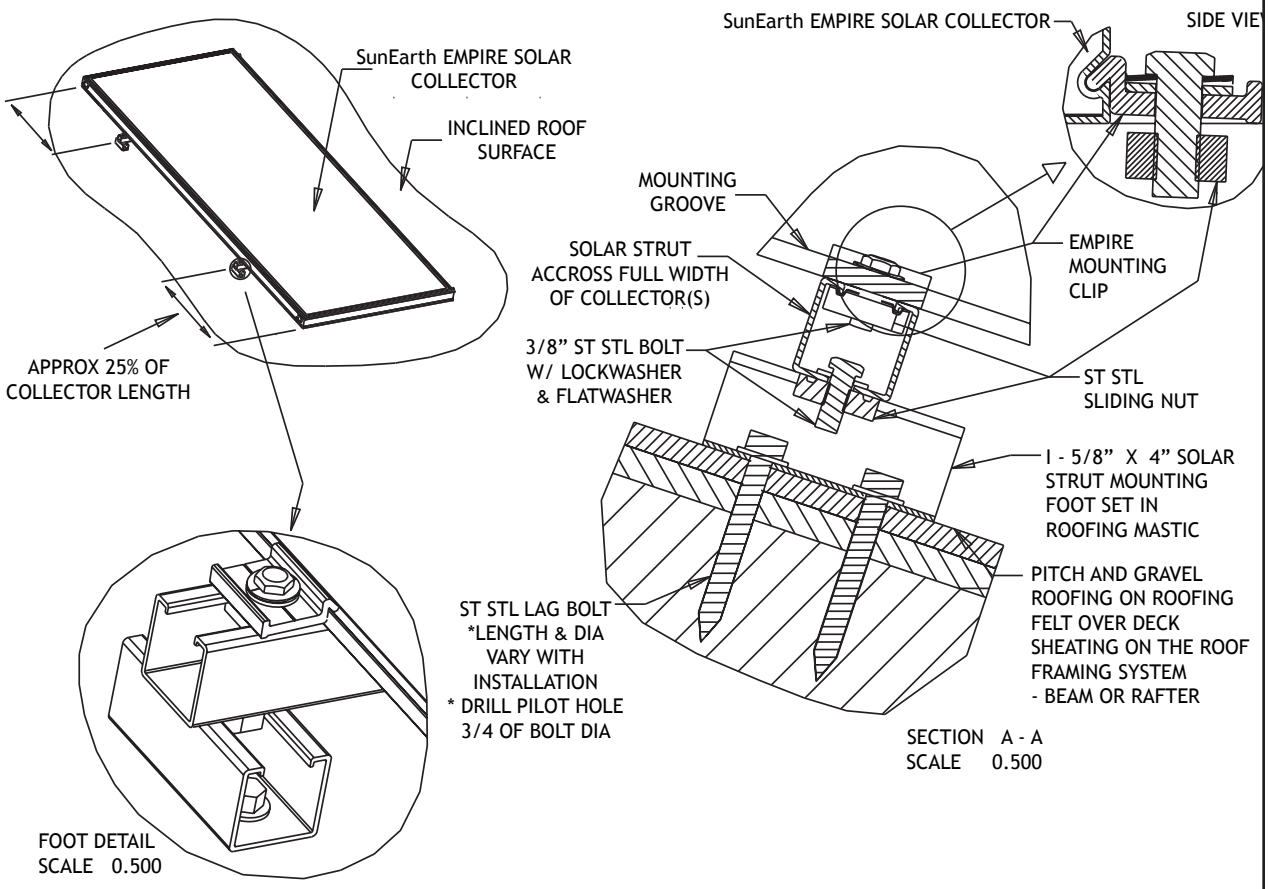
4) INSTALLATION REQUIREMENTS - SPECIFIC

4.1 Collector Orientation

The performance of solar water heating systems in the Northern Hemisphere is optimized when the collector is mounted facing True South. Performance, however, suffers very little when the collector is oriented no more than 45° East or West of True South. The collector should be unshaded by any permanent obstacle between 9:00 a.m. and 3:00 p.m. on any day of the year.

4.2 Collector Tilt

Optimal annual efficiency is achieved by tilting the solar collector at an angle that equals your latitude plus an additional 10°. This tilt angle favors the lower winter sun when collector performance is at



STRUT ON FOOT MOUNT FOR COMPOSITION ROOF

fig. 5

its lowest and minimizes overheating during the hottest summer months.

The solar collectors in a two collector staggered mount installation must be spaced far enough apart to prevent winter shading. Figure 2 and Table 1 show the correct spacing between collectors to prevent shading on December 21, when the sun is at its lowest angle.

4.3 Basic Mounting Procedures

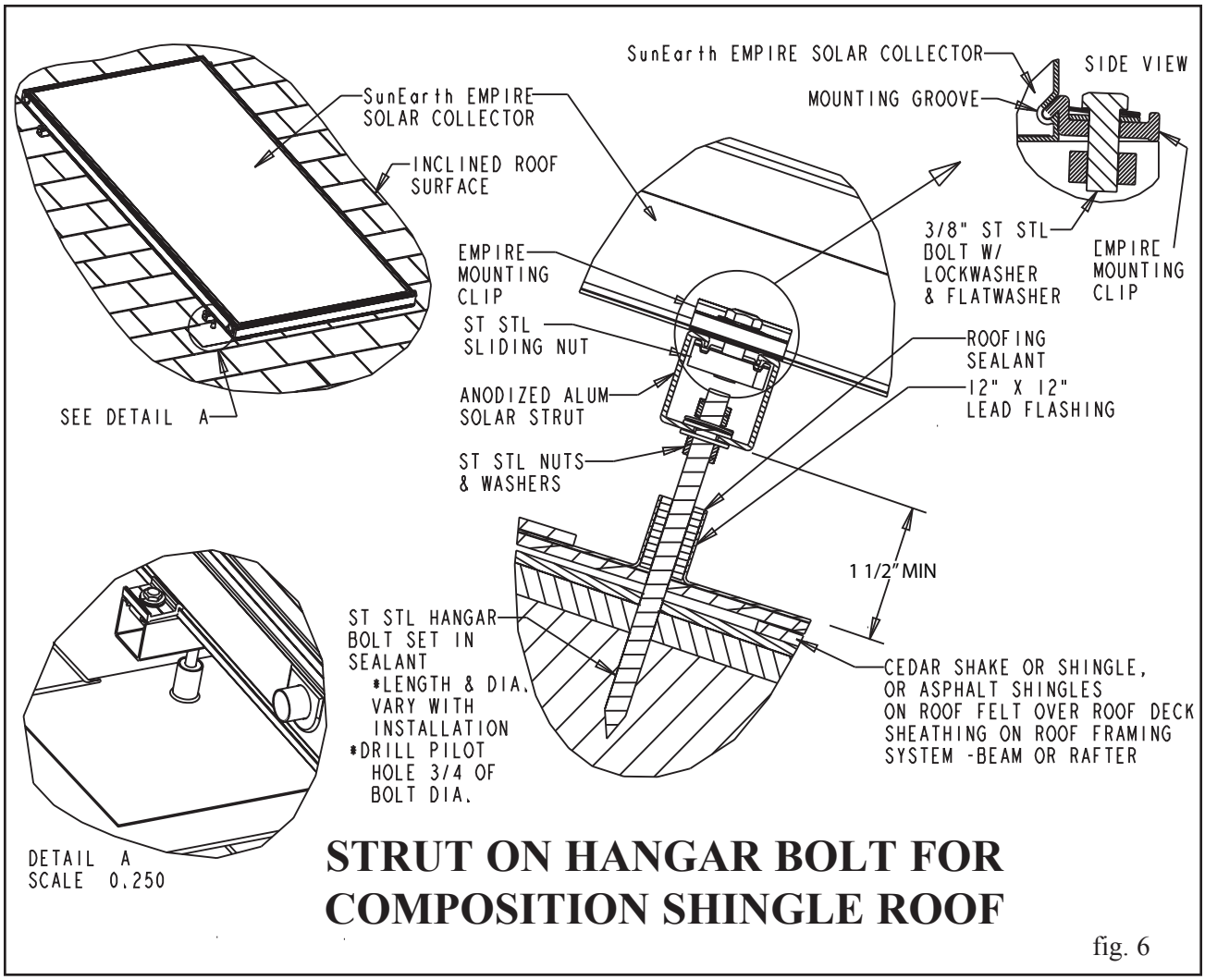
The SunEarth solar collector in your SolaRay solar system may be mounted in either a vertical or horizontal orientation on the roof (See Figure 1). Although the collector is protected from freeze conditions by the glycol HTF and does not normally need to be drained, it is still important to slope the collectors just slightly to allow for complete drainage if necessary. The recommended slope is 1/4" per foot of collector horizontal run.

To ensure proper water drainage from the glazing the collectors should maintain a minimum angle from horizontal of at least 10°. Never mount the collector directly or parallel to a flat roof surface. Use SunEarth Solar Strut tilt mount kits to rack the collectors to the proper angle if and as required.

The collector should be mounted as close to the storage tank as possible to minimize heat loss in the piping runs. If the home has attic access, mounting the collectors near the roof peak provides for additional attic workspace.

The solar collector should be mounted on the roof in accordance with these general principles:

4.3.1 The most important structural consideration is to securely anchor the solar collector and the SunEarth Solar Strut mounting hardware to the



STRUT ON HANGAR BOLT FOR COMPOSITION SHINGLE ROOF

fig. 6

structural members of the roof with stainless steel hanger bolts, lag bolts, standoff mounts or other approved roof attachment method. The solar collector shall be attached to the mounting hardware as detailed in Figures 5–11. (Note: The drawings in this manual detail mounting hardware for the SunEarth Empire series collectors).

4.3.2 The collector should be raised from the roof surface to allow for rainwater and debris to pass under the collectors and for proper ventilation of the roofing material. There should be at least 1 1/2" of clearance between the roof surface and the bottom of the solar collectors. Local codes may require greater clearance for snow shedding, etc.

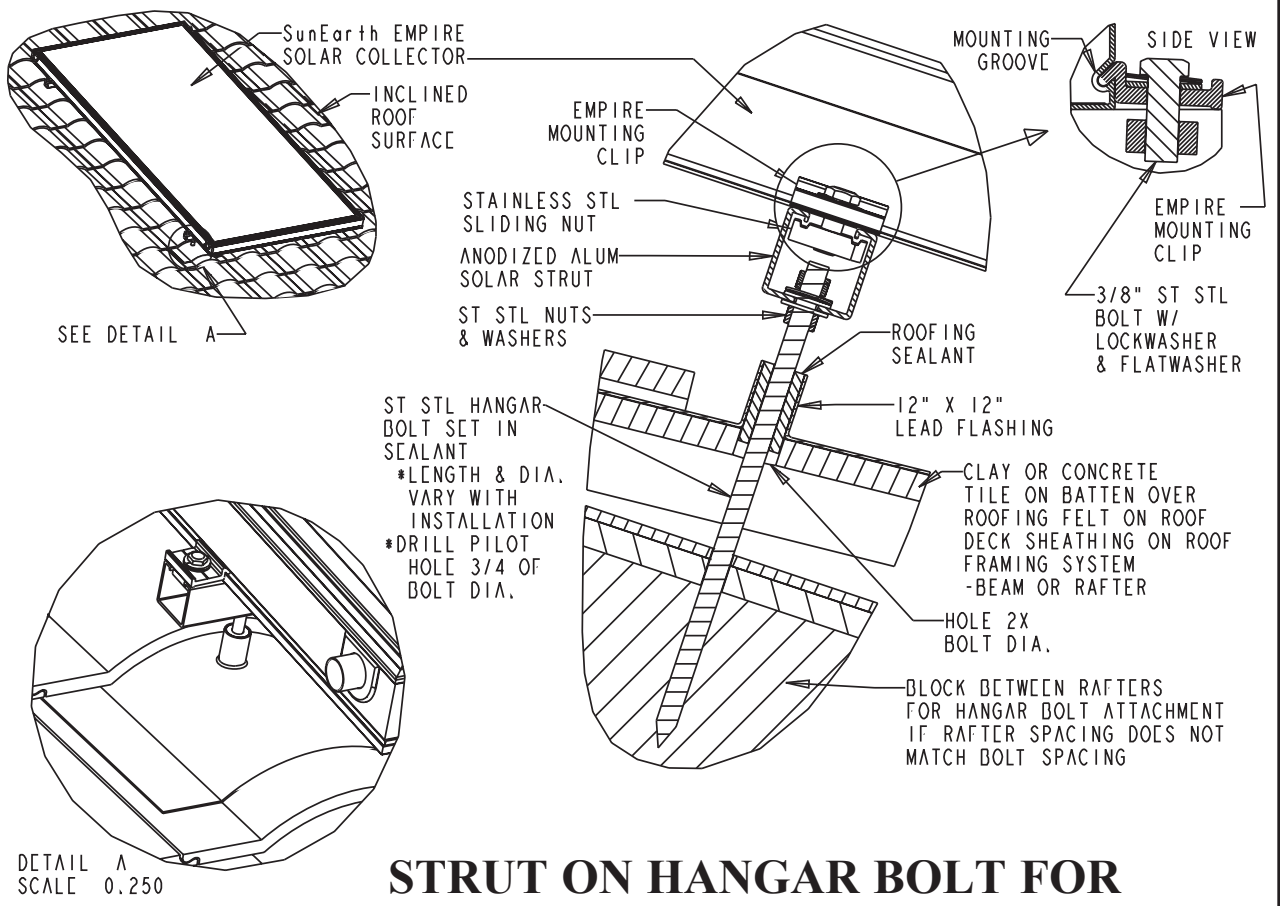
4.3.3 In selecting mounting hardware and fasteners it is extremely important to avoid galvanic corrosion resulting from the direct contact of incompatible metals. Use of SunEarth anodized aluminum Solar Strut mounting hardware and stainless steel lag or hanger bolts, lock washers and round washers is recommended. In climates subject to severe winters or high humidity use of galvanized fasteners is prohibited.

4.3.4 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 best roofing practices.

4.3.5 If the region is subject to hurricane conditions, additional steps may be required to secure the collector and mounting hardware to the structural members. In certain areas of the country, local building codes may require collector wind load testing or prescribe specific mounting procedures. Consult your local building department.

4.4 Collector Loop Pipe Insulation

The collector loop cold supply and hot return lines shall be well insulated with a high quality flexible closed cell insulation to minimize heat loss. The



STRUT ON HANGAR BOLT FOR CURVED TILE ROOF

fig. 7

insulation shall have a maximum operating temperature of 220^{O}F or higher. The wall thickness of the pipe insulation should not be less than 3/4". A 1" wall thickness is required in all areas prone to annual hard freeze conditions. When it comes to pipe insulation the rule is simple: thicker is better.

To the extent possible, slide the insulation material over the pipe without cutting or taping. All butt joints must be sealed with contact adhesive. The use of rigid polyethylene pipe insulation is prohibited. The temperatures generated by your collector in the summer months or under stagnation conditions can melt this type of material.

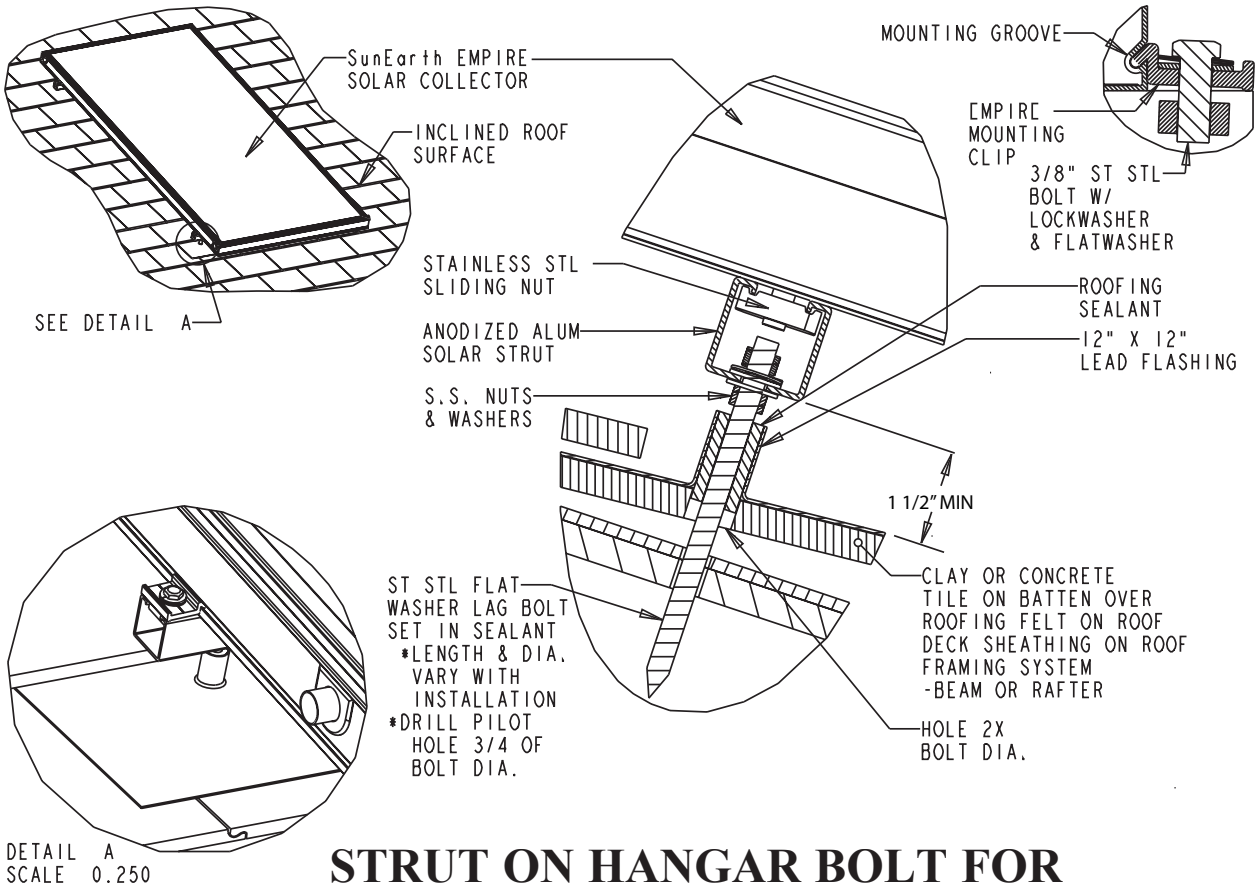
Any above ground exterior pipe insulation is subject to UV degradation and must be jacketed, wrapped with aluminum foil tape, or painted with two coats of high quality water-based acrylic resin coating as supplied by the insulation manufacturer.

4.5 Collector Plumbing

SunEarth requires the use of all copper and brass fittings in the collector loop plumbing. Couplings rather than unions should be used to join the collectors to avoid leaks and fluid loss. Lead-free solder shall be used. Use of galvanized steel, CPVC, PVC, PEX or any other type of plastic pipe is prohibited.

Piping in new solar installations can be covered with dirt, grease, solder flux or other impurities that over time affect the quality of the glycol HTF. A thorough cleaning is required before charging the system with glycol. Carefully review the cleaning procedures in "Charging The System" outlined below.

All vertical piping between the storage tank and the collector shall be supported at each story or at maximum intervals of ten feet (10'). Horizontal roof runs shall be secured and supported providing at least 1-1/2 inches clearance from roof. Standard best piping practices shall be followed as described in the



STRUT ON HANGAR BOLT FOR FLAT TILE ROOF

fig. 8

Uniform Plumbing Code, International Plumbing Code or other recognized code or standard. Copper plumbers tape or tube strap is required. The pipe insulation should not be compressed or crimped by the strapping material.

The installation of all horizontal and vertical piping shall not reduce the performance or rating of any structural member or fire rated assembly. Adhere to all applicable local codes and ordinances.

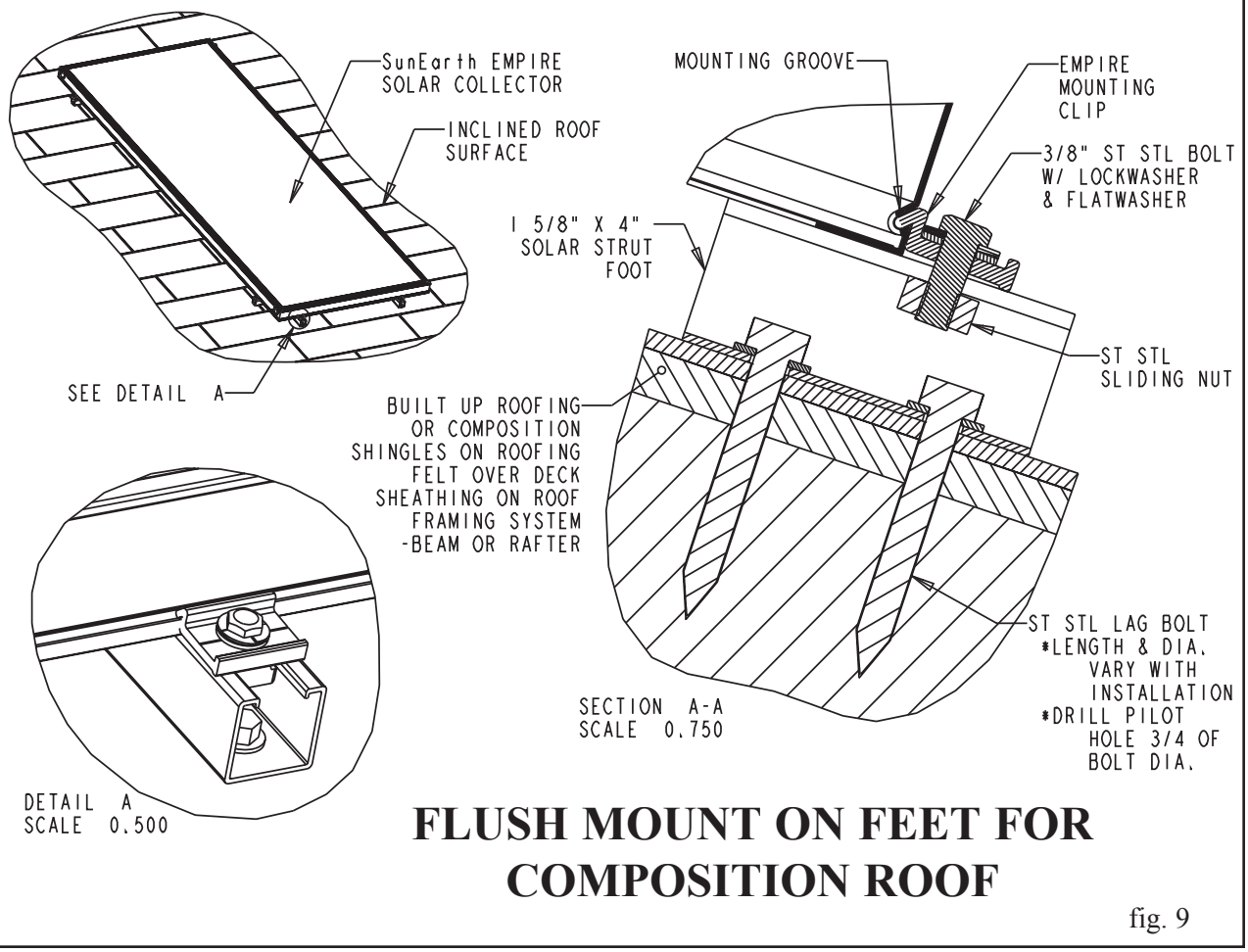
4.6 Collector Sensor Placement

The collector sensor shall be located on the hot water return line as close to the collector as possible. Sensors are typically accurate to +/- 1/2°F if properly installed and weatherized. The collector probe sensor shall be attached to the SunEarth collector header pipe either with a stainless steel hose clamp or by inserting the probe sensor into a thermalwell in contact with the fluid near the outlet header pipe.

It is recommended that the connection between the silicon sensor lead and low voltage sensor wiring be made inside the attic or other indoor space or inside a NEMA 4X junction box. When using wire nuts to make the connection, the crimped brass cap on the end of the sensor wire should be striped before inserting into the wire nut. Where connections from the sensor lead to the low voltage wiring is made at an exposed location the connection should be by crimp and heat shrink or solder and heat shrink butt connections. Wire nuts or screw connectors should not be used in exposed locations due to the likelihood of corrosion which will result in a compromised electrical connection.

Thoroughly wrap and weatherize the insulation with electrician's tape or insulation tape as provided by the manufacturer. See Figure 12 for collector sensor installation detail.

If an electrical potential exists between the roof and ground, this may induce current to flow down the



FLUSH MOUNT ON FEET FOR COMPOSITION ROOF

fig. 9

sensor wire to the controller. This current will result in a false signal being received by the controller and hence incorrect temperature readings. To prevent such current the copper plate and piping should be independently grounded. This will provide a separate path to ground from the roof which does not interfere with the sensor readings.

Grounding can be achieved by running a separate ground wire to the collectors or ensuring that the copper pipe in the closed loop is grounded and there are no electrical discontinuities between the grounding point and the collector. Grounding of the collector & roof piping is especially important in locations that often experience electrical storms and electrical atmospheric activity.

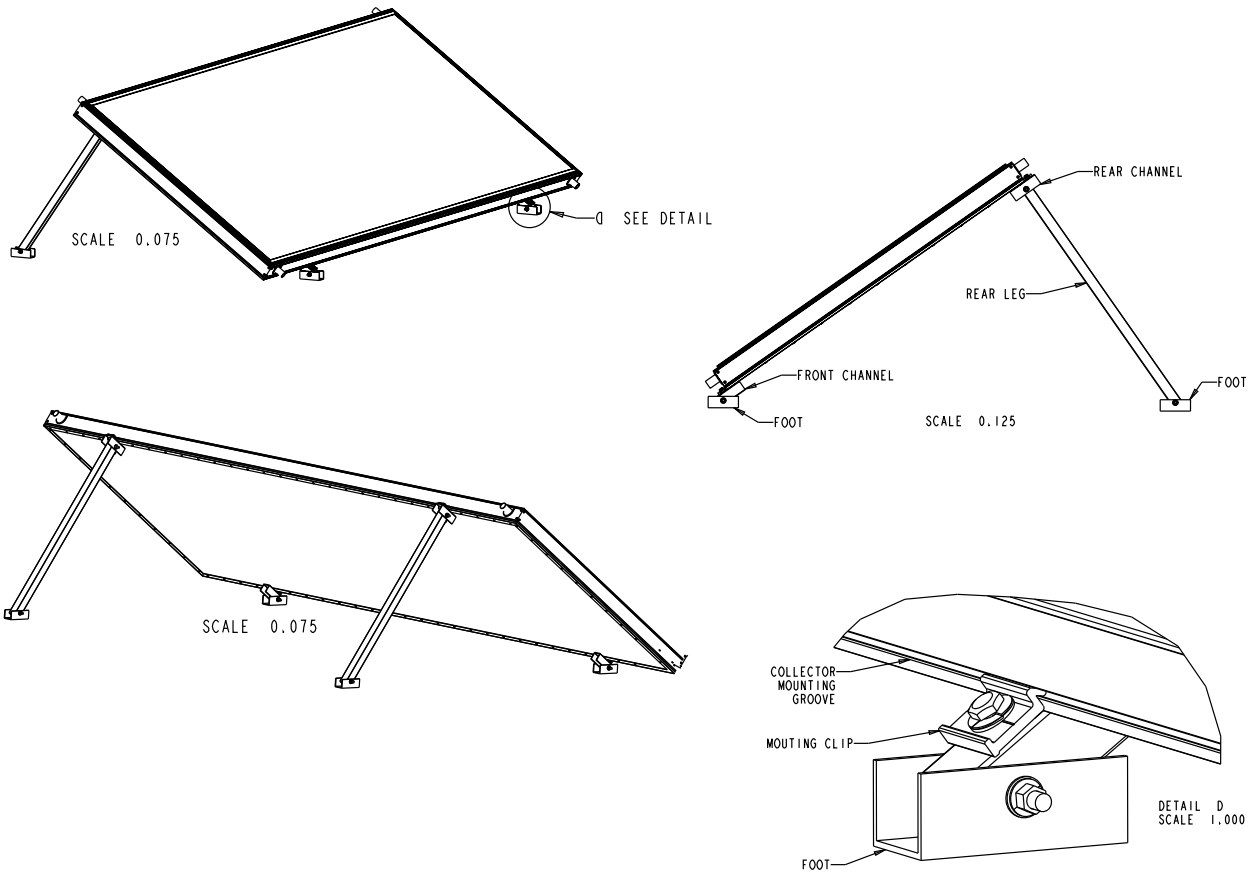
4.7 Low Voltage Wiring

The low voltage wiring used to connect the sensor lead to the controller shall be a minimum18 AWG. The wiring should be bare or tinned copper, two conductor, stranded, PVC insulated, with a PVC UV rated jacket suitable for exterior use. In locations that often experience electrical storms and electrical atmospheric activity the low voltage sensor wire should also be shielded and the shielding connected to ground.

The low voltage sensor wire must not be in direct contact with the copper pipe as the wire insulation may melt when in contact with hot copper pipe. Low voltage sensor wire must be run OUTSIDE the pipe insulation, where the low voltage wire is run in an exposed location, it should be run OUTSIDE the pipe insulation but UNDER the insulation jacket or wrap to protect the wire from UV exposure.

4.8 Installing the Solar Storage Tank and Expansion Tank

In plumbing the solar storage tank and expansion tank make sure that all the components are accessible and easy to reach. Provide for clear access to the storage tank, pump, expansion tank, mixing valve, time clock and other key components. If a



UNIVERSAL TILT MOUNT (MAY BE USED FOR LANDSCAPE OR PORTRAIT TILT MOUNT)

fig. 10

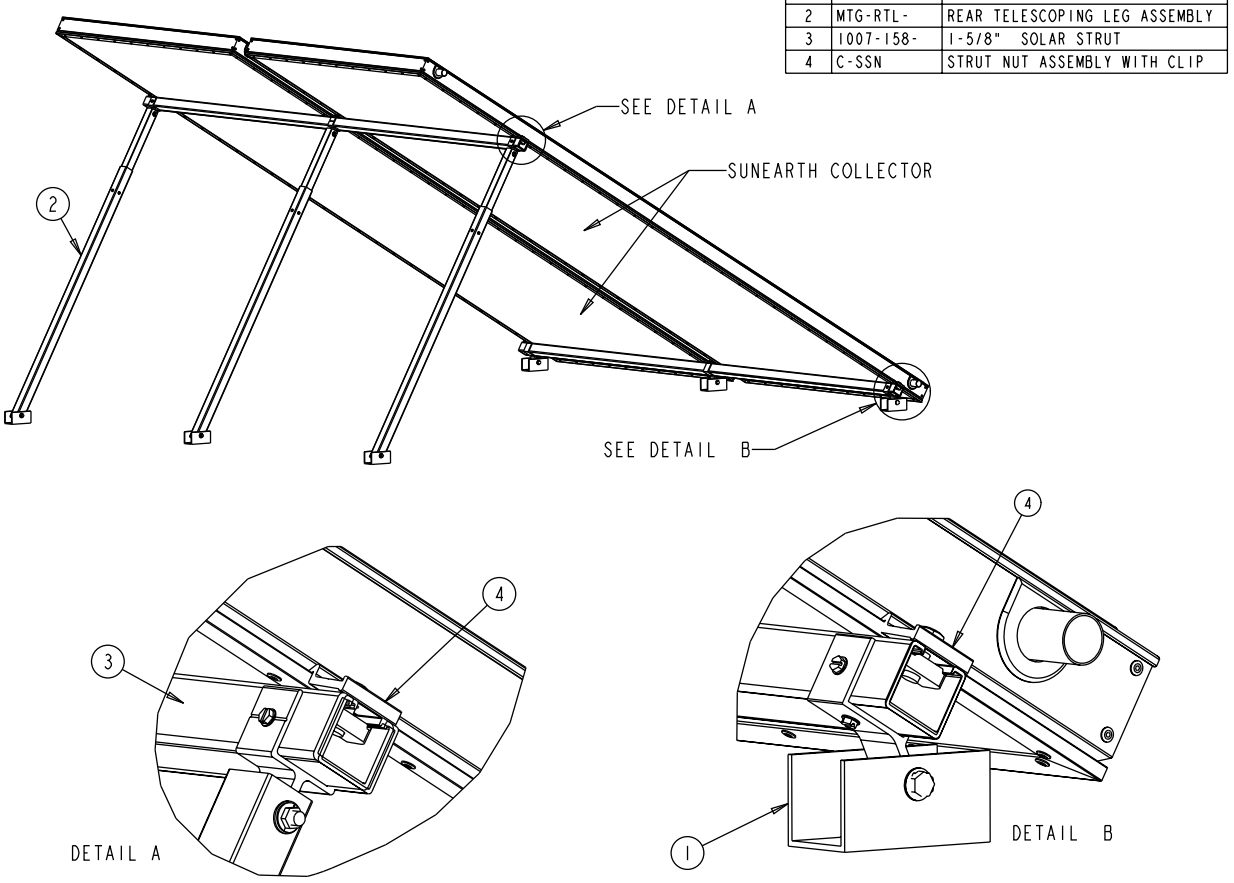
component in the potable water side of the system may require future service or maintenance make the connections with brass unions or other approved connections. Use only brass nipples and unions and copper and brass fittings in plumbing the solar storage tank and expansion tank. The use of galvanized fittings or nipples, CPVC, PVC or other plastic pipe is prohibited. Di-electric nipples may be required by some (Authority Having Jurisdiction) AHJ on the potable side.

Hard copper connections to the city cold water supply line and the home hot water feed lines are recommended. The gaskets in standard water heater flex hose connectors can become brittle and compressed over time and begin leaking on the water heater. If not detected in a timely manner even a small drip or leak may cause serious damage to the tank's electrical components or, in extreme cases, may cause the tank to leak from the outside in.

Tank plumbing is required to provide for the isolation of the solar storage tank from the city cold water supply line by means of an isolating ball valve (COMPONENT #23, FIGURES 15 & 16).

The differential temperature controller shall have a screen readout to show temperatures of the collector and storage tank. Otherwise, line thermometers shall be installed in the collector supply and return lines to allow for a simple diagnostic check of proper system operation. On a sunny day the hot water return line should be approximately 5 – 12° warmer than the water in the collector supply line. Compare the temperature readings in the two line thermometers (COMPONENT #3, FIGURES 15 & 16).

The circulation pump shall be the Grundfos model UPS15-58FC, 115 volt, or approved equal. The



REX RACK
(FOR MULTIPLE COLLECTORS WITH PORTRAIT TILT)

fig. 11

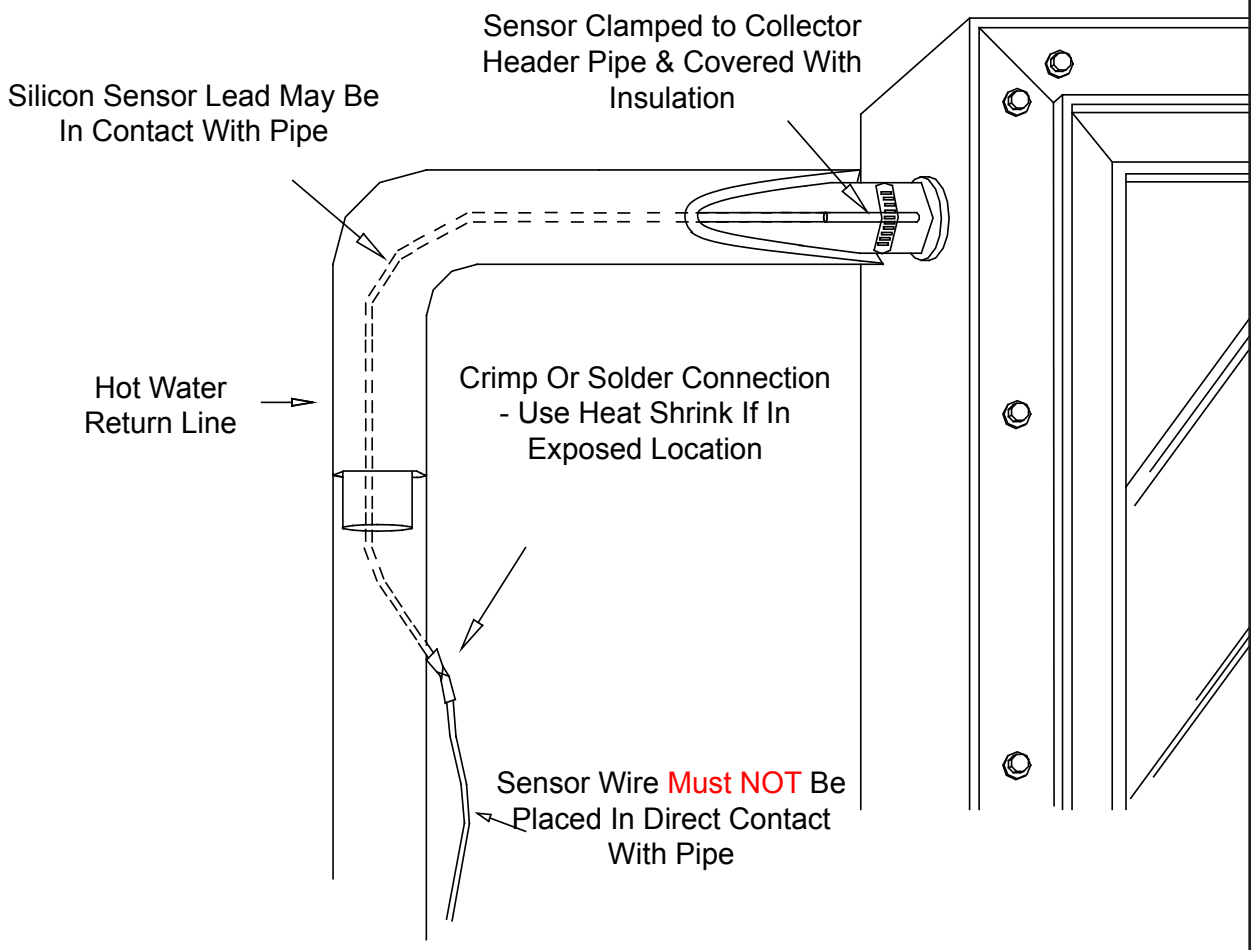
pump shall be prewired with a 6' line cord so that it can be plugged directly into the 115 volt receptacle on the bottom of the differential control. Two way ball valves shall be installed on either side of the circulating pump (COMPONENT #12 & 14, FIGURES 15 & 16) so that the pump can be isolated from the collector loop piping. Repairs or routine system maintenance shall be completed without introducing air into the system or draining the HTF.

The expansion tank shall have a minimum 150 PSIG working pressure and have a total volume of not less than 4.4 gallons. The standard factory charge should be 12 PSIG. The expansion tank shall be rated for non-potable water with a minimum charge of 12 PSIG. The expansion tank shall be a Watts Regulator FWS 18 or approved equal.

An additional potable expansion tank may be required by the plumbing code on the potable piping to the solar tank if there is a backflow preventer between the household piping and the street mains.

A high quality thermostatic mixing valve is a required component in all OG-300 certified systems and should be plumbed in line with brass union connections for ease of future repair or replacement (COMPONENT #32, FIGURES 15 & 16). The mixing valve shall be standard ASSE 1017 approved. The specified mixing valve shall be the Heatguard Model HX110D, or equal and should have an operating range between 95°F and 120°F. The mixing valve shall be adjusted to no more than 122°F delivered water temperature.

The temperatures generated by your SolaRay system will vary throughout the year. In the Northern



COLLECTOR SENSOR fig. 12

Hemisphere the water temperature will be hottest in the spring and summer months while cooler temperatures are to be expected from November through March. On sunny days finished solar tank temperatures may range between 110ºF to 180ºF depending upon the season and hot water demand. The mixing valve described above blends the hot and cold water supplies to deliver hot water to your fixtures at a safe, controlled temperature.

⚠WARNING: SCALDING CAN OCCUR WITHIN FIVE SECONDS WHEN WATER TEMPERATURES APPROACH 140ºF. THE MIXING VALVE SHALL BE ADJUSTED BY YOUR CONTRACTOR TO PROVIDE WATER TO YOUR FIXTURES AT NO MORE THAN 122ºF.

The 3/4" cold water supply line to the solar storage tank shall be insulated with minimum 7/8" X 1/2" pipe insulation to a minimum distance of 5' behind the storage tank, or to the wall if closer than 5'.

4.9 Tank Sensor Placement

Figure 17 details the proper placement of the solar storage tank sensor. Tank sensor shall have good thermal contact with the tank wall in order to accurately measure the temperature of the water at the bottom of the tank. It is recommended that the sensor be installed in a brass or copper thermalwell screwed into the lower sensor port in the tank.

Thoroughly weatherize the wire connections in accordance with the roof sensor detail above.

4.10 Tank Insulation

SunEarth heat exchanger tanks have an insulation value of approximately R-17.3.

Conventional back-up electric water heaters have insulation values between R-12 and R-20. The R value expresses the thermal resistance of the tank insulation. The higher the "R-value" value the more effective the insulation material is at preventing heat loss.

The storage tank should not be placed directly on an uninsulated floor or concrete slab. In order to prevent moisture damage to the base of the tanks and reduce heat loss to the floor slab, the tank should be raised off the floor on a pad.

4.11 Electrical and Wiring Requirements

When electric element is used as the auxiliary heat source a properly licensed contractor shall make the 230 volt electrical connection to the water heater or solar storage tank and the optional electronic time switch (COMPONENT #33, FIGURES 15 & 16). If your solar contractor is not allowed by law to make these connections consult a licensed electrician.

Never activate the circuit breaker controlling the electrical heating element until the solar storage tank is completely filled with water. This will prevent "dry firing" of the heating element. The electrical heating element will be destroyed almost instantaneously if not completely submerged in water when activated. Make sure the water heater circuit breaker is off until the solar storage tank is completely filled.

We recommend the use of a 115 volt differential control with a factory installed six foot line cord. The installation requires one 115 volt outlet to be installed near the solar storage tank. Plug the control into the outlet. The circulation pump line cord is plugged into the receptacle on the side of the controller. A 230 volt control and circulation pump may be substituted, but troubleshooting the components in the future becomes more difficult.

The specified differential temperature controller is the SunEarth model SETR0301U (COMPONENT #18, FIGURES 15 & 16), or approved equal

4.12 Heat Transfer Fluid (HTF)

The specified HTF is DowFrost HD, or approved equal. To ensure maximum effectiveness for corrosion protection, the glycol inhibitor package is designed for a minimum 25-30 percent concentration of glycol in water. Table 4 shows the concentrations of Dowfrost HD required to provide freeze and burst protection at various temperatures. Use the mixture most appropriate for your climate. Do not use a higher glycol to water concentration than necessary, as this will adversely impact the relative heat transfer efficiency of the solution.

Generally, for an extended margin of protection, you should select a temperature that is at least 5°F lower than the expected lowest ambient temperature. These figures are examples only and should not be regarded as specifications. As use conditions are not within our control, neither SunEarth nor Dow Chemical guarantees that freeze damage may not occur at temperatures other than shown.

Water used to dilute the HTF must meet certain minimum standards for purity. Impurities in the dilution water can increase metal corrosion, reduce the effectiveness of corrosion inhibitors, increase inhibitor depletion rate, and cause the formation of scale and other deposits on the heat exchanger's internal heat transfer surfaces.

Distilled or deionized water shall be used.

The HTF pH level must be maintained between 8 and 10 to minimize corrosion and glycol oxidation in the piping system.

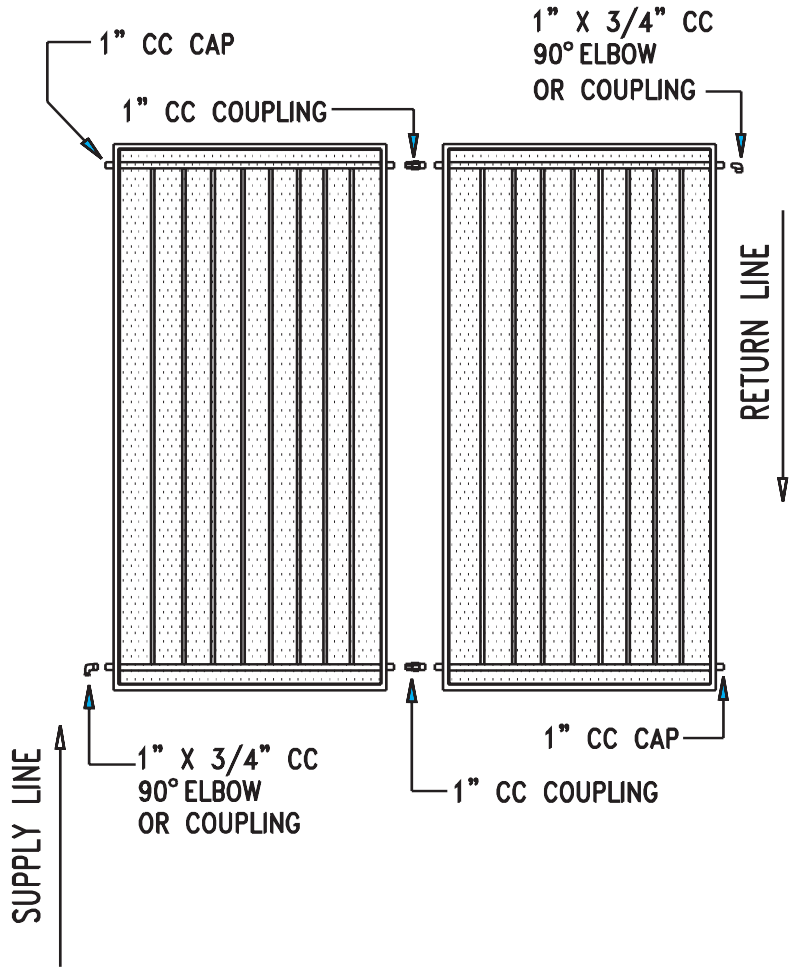
4.12.1 Flushing and Charging the System

Once the components are plumbed you are ready to fill the solar storage tank with water and to charge the collector loop with a mixture of heat transfer fluid (HTF) and water. Due to variations in municipal water quality throughout the country, distilled or deionized water shall be used to mix with the glycol HTF. Proceed as follows:

4.12.2 STEP 1 - fill the solar tank with water and check that there are no leaks on the potable side of the system.

Do this by opening the cold water isolation ball valve to the solar tank (COMPONENT #23, FIGURES 15 & 16) and opening a hot water outlet, such as a faucet, until the water runs freely. When the tank is filled, inspect all threaded fittings and solder joints for leaks.

fig. 13



COLLECTOR PLUMBING - VERTICAL MOUNT

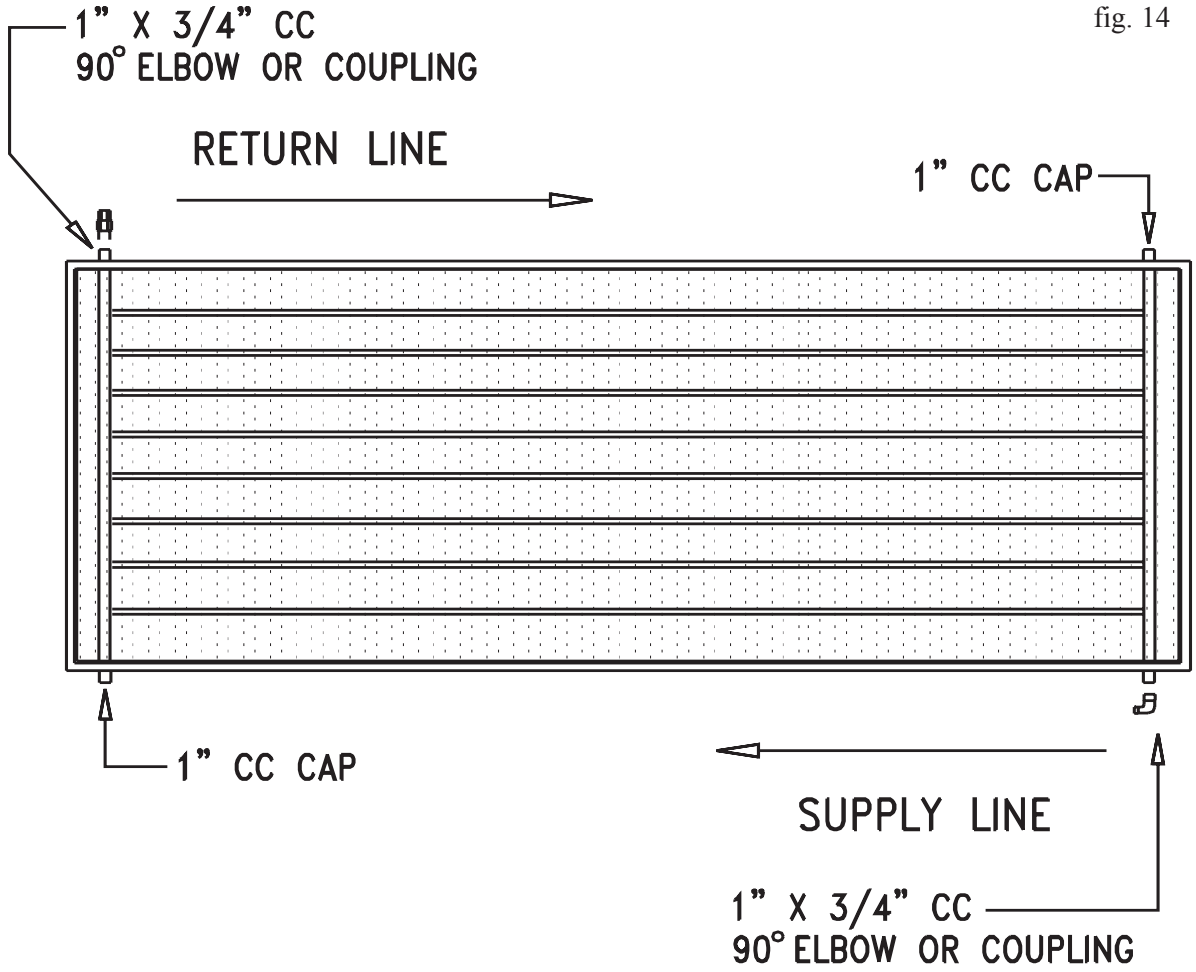
4.12.3 STEP 2 - thoroughly flush all impurities out of the collector loop and check collector loop for leaks.

Begin by connecting a washing machine type hose to the upper charge valve (COMPONENT #9, FIGURES 15 & 16) and fill the collector loop with water. The isolation ball valve (COMPONENT #10, FIGURES 15 & 16) remains closed at this point. While the hose is still connected to the upper charge valve and the water is running, open the lower purge/drain valve (COMPONENT #11, FIGURES 15 & 16) and let the water run out until it is free of impurities or debris that might have entered the piping as the components were plumbed. Water soluble flux should be used when soldering pipe joints in the collector loop in order to facilitate system flushing. Run the water long enough to eliminate any air bubbles that may be trapped in the system.

The non-potable expansion tank should not be connected to the collector loop during flushing to prevent debris from lodging inside the expansion tank chamber.

Close the lower purge/drain valve. The collector loop now has been subjected to city pressure. The PRV is set to 125 PSI so it should not discharge when subjected to city water pressure. Close the fill valve and allow the pressure in the loop to stabilize, if the city water pressure is higher than the PRV open the purge valve slightly to allow the loop pressure to drop to about 60 PSI. Once stabilized, the collector loop pressure should remain fairly constant. A continuous drop in pressure is an indication of a leak in the system. Make a final inspection of the collector plumbing connections to ensure that there are no leaks anywhere in the collector loop piping.

fig. 14



COLLECTOR PLUMBING - HORIZONTAL MOUNT

4.12.4 STEP 3 – run circulator pump to check pump operation, good flow and air has been eliminated from collector loop.

After you have determined the integrity of the entire piping system, turn on the circulating pump. Do this by setting the manual switch within the controller to the "on" position. Run the pump for a full five minutes and carefully check to ensure there is proper fluid flow and that all the air has been purged from the collector glycol loop. An inexpensive flow meter such as manufactured by Blue White Industries or Letro is recommended as an optional system component. A flow meter allows you to monitor and adjust the flow rate through the piping and also to visually inspect the HTF fluid quality.

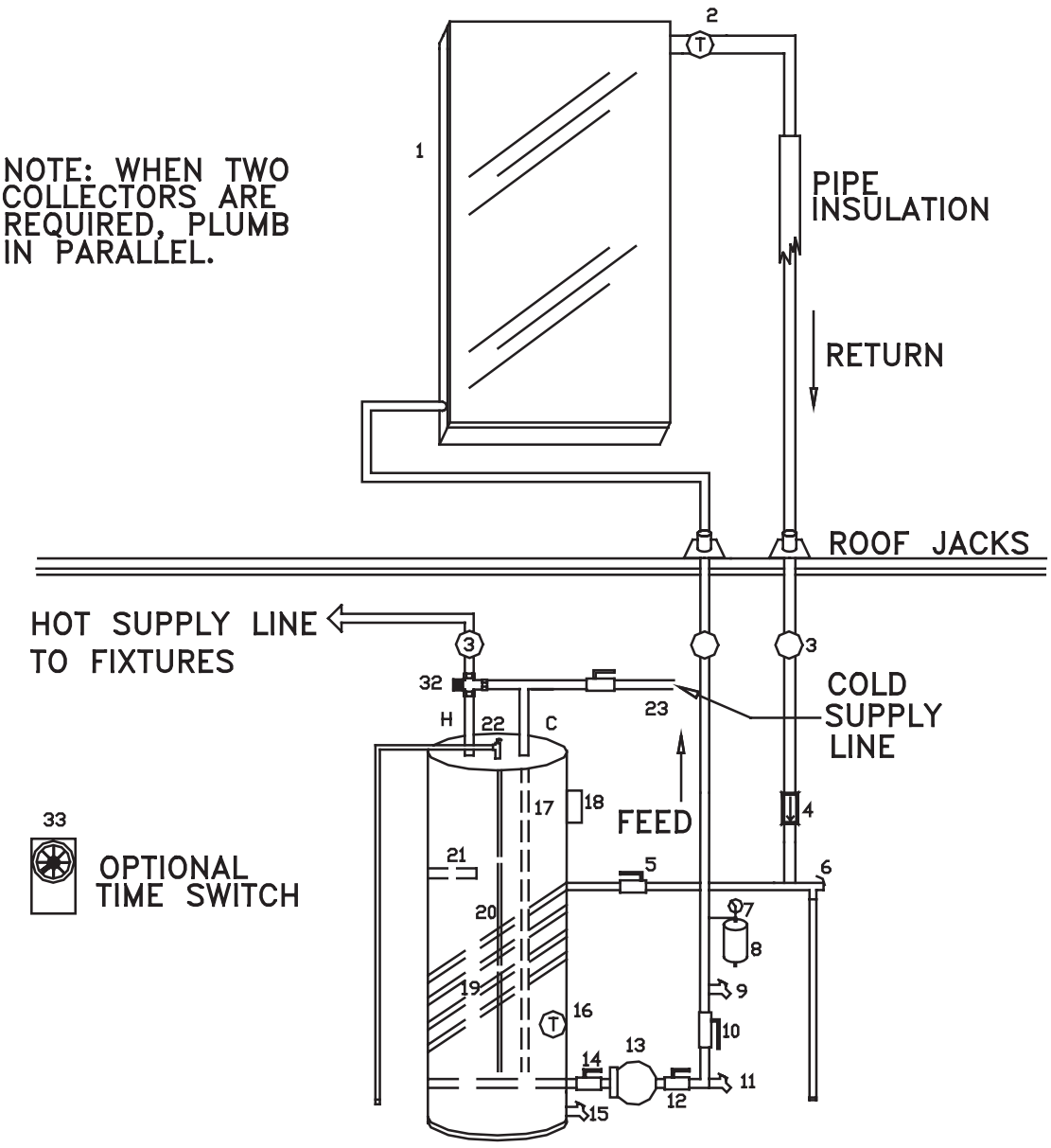
Set the controller to the "off" position and proceed to the next step.

⚠WARNING: THE NEXT STEP MUST BE CARRIED OUT THE SAME DAY. DO NOT LEAVE THE COLLECTOR LOOP FILLED WITH WATER OVER NIGHT OR YOU RISK FREEZING THE LOOP AND BURSTING THE PIPES.

4.12.5 STEP 4 – replace water in the collector loop with glycol HTF mixture.

First mix the propylene glycol HTF and distilled water mixture in accordance with Table 4 and Table 5 in a large clean bucket. You will need a second empty bucket as well. The charging process will require a high head pressure pump capable of producing 50 PSI (115 ft head) pressure to charge the system.

fig. 15

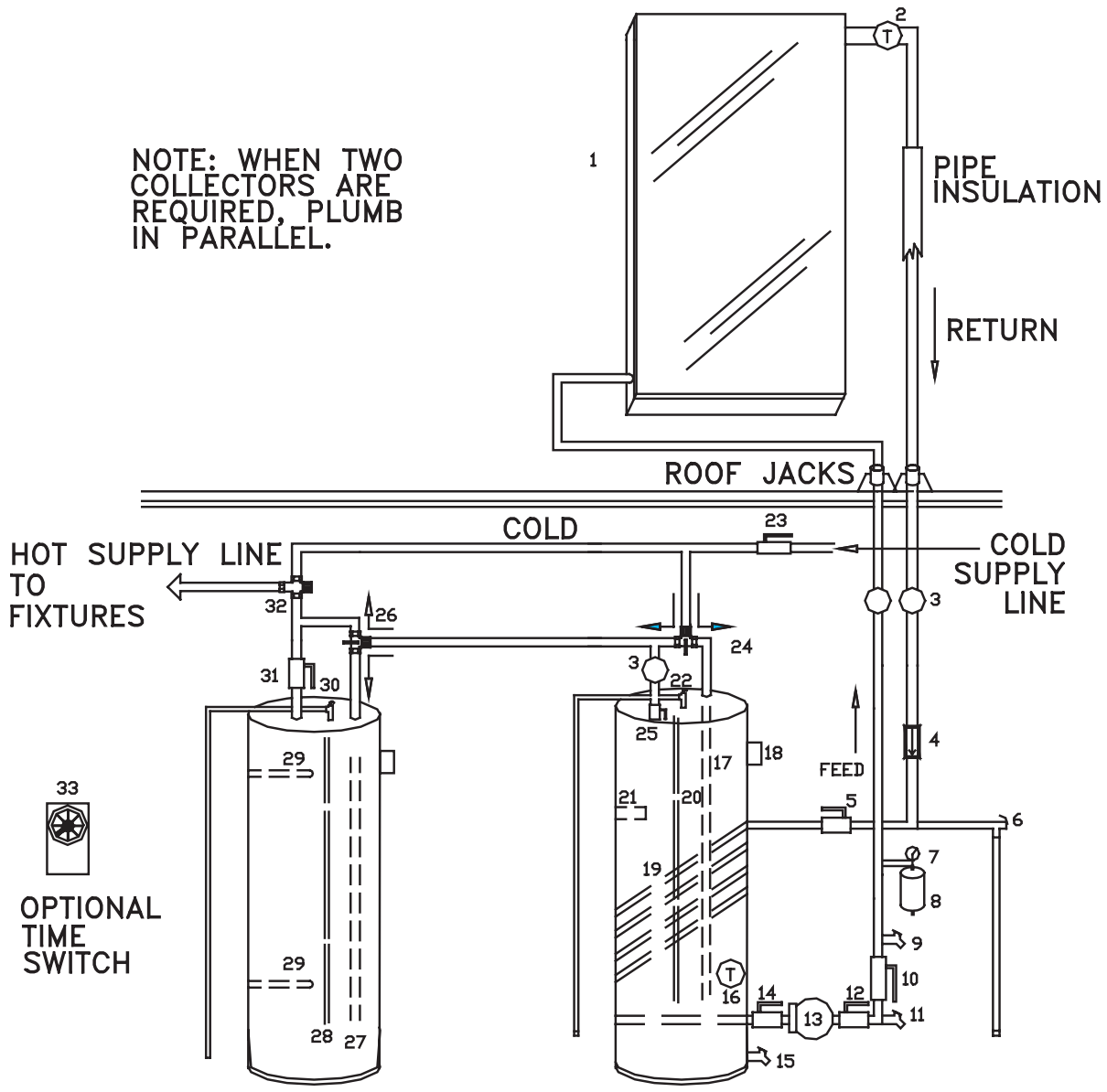


SINGLE TANK SYSTEM SCHEMATIC

Connect the discharge side of the charging pump to the upper charge faucet (COMPONENT #9, FIGURES 15 & 16). Place the pump suction side hose in the empty bucket. Close the isolation ball valve (COMPONENT #10, FIGURES 15 & 16) and connect a second hose to the lower charge faucet (COMPONENT #11, FIGURES 15 & 16). Place the other end of the second hose in the empty bucket.

Open the upper charge faucet and allow the pressure from the expansion tank to push the water in the glycol loop back to prime the pressure pump. When the hose in the bucket containing the glycol mixture stops bubbling close the charge valve and transfer the hose from the empty bucket to the bucket filled with HTF mixture. Now, you are ready to begin charging the collector loop with glycol.

fig. 16



DOUBLE TANK SYSTEM SCHEMATIC

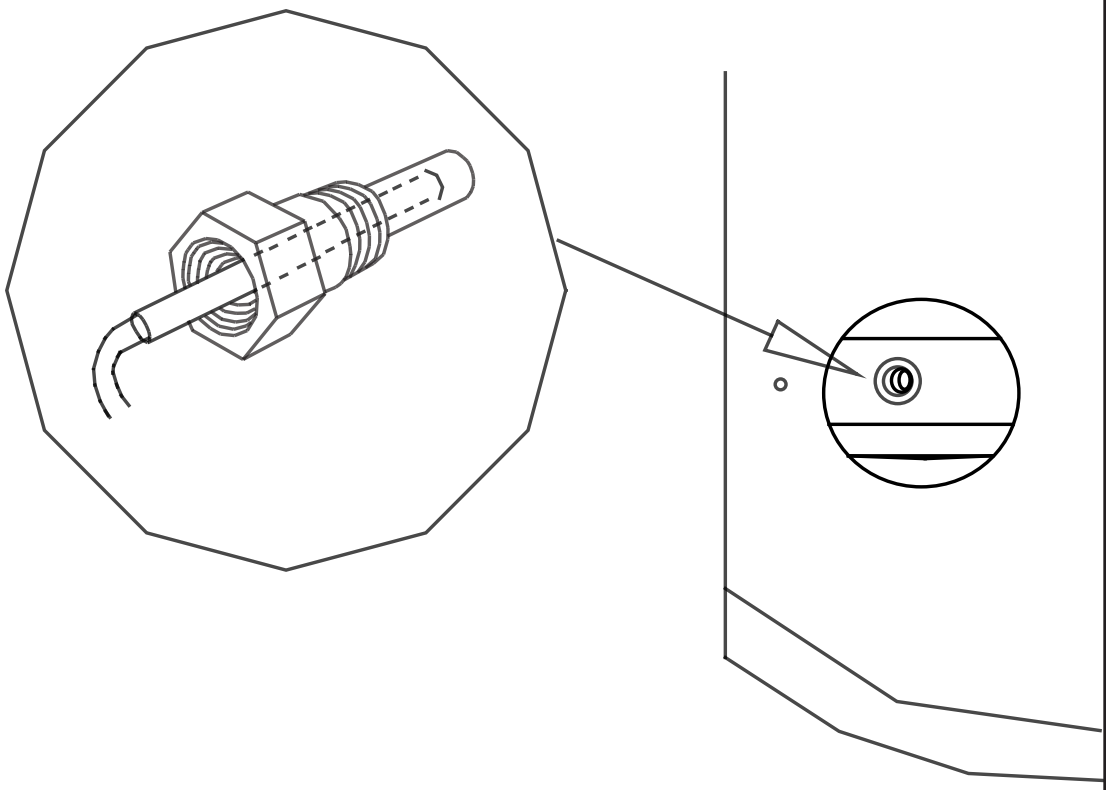
With both fill and purge valves now open, run the charge pressure pump until the pinkish glycol mixture begins flowing into the empty bucket. Once you see this, quickly switch the hose from the empty/return bucket to the bucket containing the glycol mixture. Continue to circulate the fluid through the collector loop and bucket using the pressure pump until the bubbling has stopped and the air has been purged.

While the charge pump is circulating the HTF fluid through the collector loop, briefly open the valve on the expansion tank leg in order to flush out the water in this leg and replace with glycol HTF fluid.

4.12.6 STEP 5 - pressurize the collector loop to required pressure.

After charging the collector loop, shut the lower charge faucet and let the pressure pump drive up

fig. 17



TANK SENSOR

the loop pressure to the appropriate level (Generally in the range of 30 – 40 PSI). To more accurately calculate the minimum pressure required in the loop, measure the height of the solar collector above the solar storage tank, divide this number by 2.31, then add 20 PSI to this number. As a word of caution, the pressure in the glycol loop should not exceed the setting of the PR valve when the system is operational on a good sunny day. Contact your solar contractor if the charged collector loop pressure exceeds this threshold.

Table 4

Percent (volume) Glycol Concentration Required

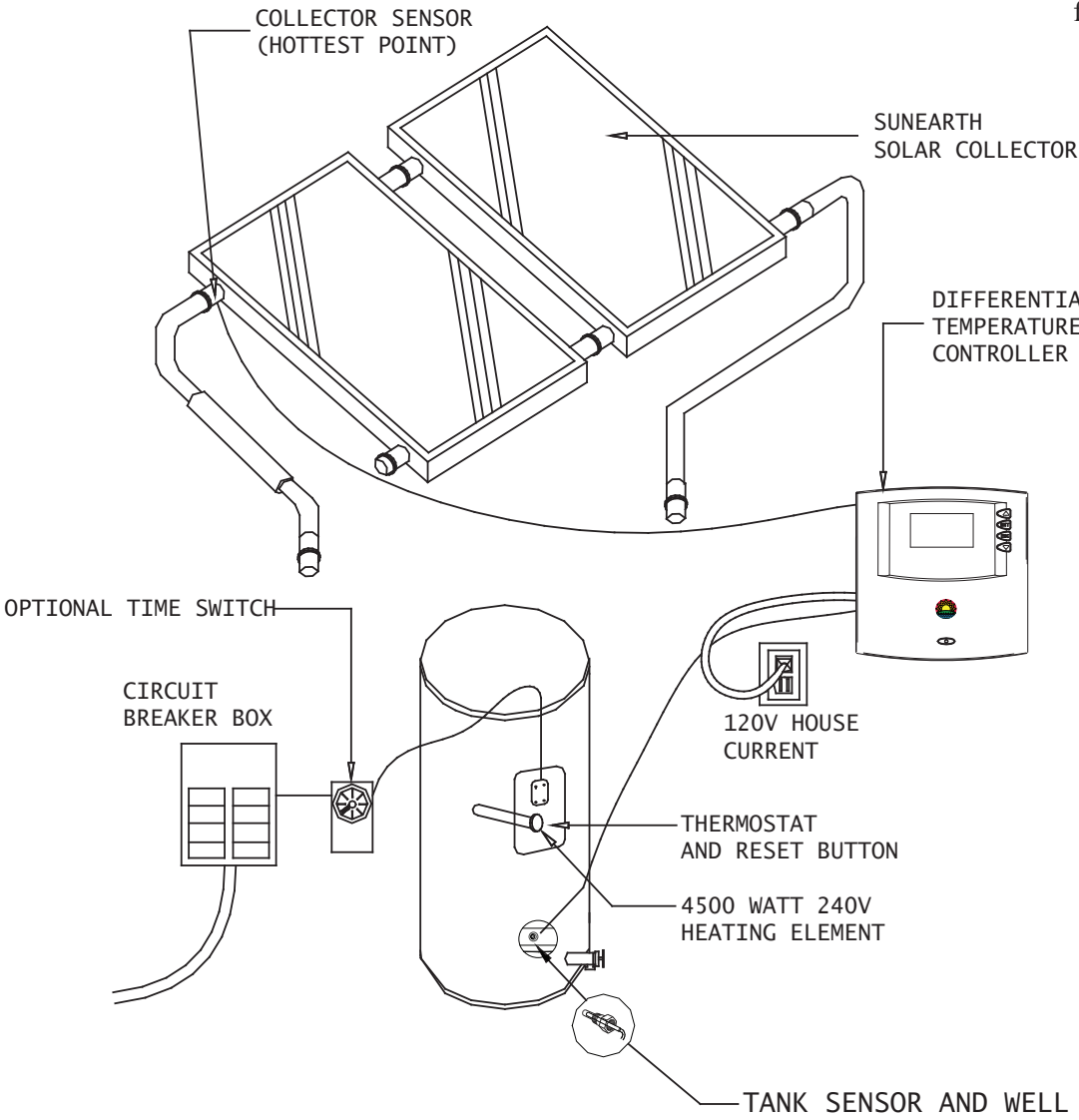
Temperature F	For Freeze Protection	For Burst Protection
20	18%	12%
10	29	20
0	36	24
-10	42	28
-20	46	30
-30	50	33
-40	54	35
-50	57	35
-60	60	35

Your SolaRay solar water heating system must be charged and the fluid quality maintained by an experienced contractor. If the system is drained during the winter, or you notice a significant drop

Table 5	
Total Collector Loop Fluid Capacity In Gallons*	
1 Collector System	4 Gallon
2 Collector System	5 Gallons

* Assumes a total 100’ pipe run using 3/4” Type M hard copper tubing. The SunEarth, Rheem or Ruud heat exchanger has a 2.2 gallon fluid capacity.

fig. 18



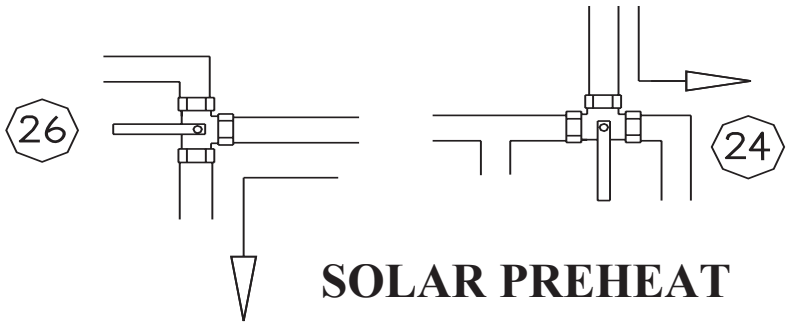
ELECTRICAL COMPONENTS

in collector loop pressure, contact your installation contractor immediately for service. The glycol HTF provides the freeze protection for your system and must be properly maintained. An experienced contractor should (define) periodically check the HTF fluid quality.

5) SYSTEM START-UP PROCEDURES

Throughout the installation procedures outlined in Section 4 above, emphasis has been placed on the correct procedures for plumbing and wiring the components, checking for plumbing leaks, pressurizing the collector loop and eliminating any trapped air that can impact fluid quality and pump performance. Having completed these tasks it is time to start up your SolaRay solar water heating system.

When the glycol loop has been fully charged and the pressure is around 35 psi (check the pressure gauge, (COMPONENT #7, FIGURES 15 & 16), set the differential controller to the "Automatic" setting. This will activate your circulating pump when the temperature differential between collector and tank is sufficient to provide useful heat. The SunEarth controller will switch the pump on when the differential is 16^{O}F. The controller will switch the pump back off when the differential falls to 8^{O}F. The controller also allows you to limit the finished solar storage tank temperature if desired.



SOLAR PREHEAT

fig. 19b

The SunEarth controller maximum tank default setting is 140^{O}F; this setting can be adjusted as described in the control manual.
Adjust the valve settings in accordance with Section 6 below.

6) TWO MODES OF SYSTEM OPERATION

Both single and double tank Solaray systems are designed to accommodate two separate modes of operation. Your solar water heating system can, (1) serve as a pre-heater to your conventional water heater adding solar energy when and as available, or (2) completely bypass the solar collector loop and solar storage tank and run 100% on utility energy during inclement weather.

SINGLE TANK SYSTEM MODES OF OPERATION

6.1 Solar Preheat

Set the tank thermostat to the lowest acceptable temperature setting. The electric resistance heating elements will come on only when the tank temperature falls below the thermostatic set point. If the solar heated water entering the tank is warmer than the thermostatic set point, the electric heating elements will not come on. If your system has an optional time switch, you may preset the timer to turn the heating element on and off at specified times throughout the day if desired. The timer is usually set to only allow the element to come on in the late afternoon and night after the solar collectors are no longer able to provide significant heat. The time switch also can be overridden so that you operate on 100% solar power when conditions allow.

6.2 100% Utility Power

Leave the circuit breaker to your solar storage tank on and close the isolation ball valves in the collector loop (COMPONENT #5 & 10, FIGURES 15 & 16). In this mode of operation you **must** turn off the circulation pump. To turn the pump off, change the operational setting from automatic to “off”. Failure to turn off the pump can quickly damage the pump motor, shaft, bearings or impeller.

TWO TANK SYSTEM INSTRUCTIONS

6.3 Solar Preheat

Follow the instructions for the single tank system for setting the thermostat and the heating elements for automatic operation. The three way valve above the solar storage tank (COMPONENT #24, FIGURES 15 & 16) must be in the vertical position. Each valve handle (COMPONENT #24, 25 & 26 FIGURES 15 & 16) must be placed in the horizontal position. See Figure 19b, Solar Preheat.

6.4 100% Utility Power

Follow the instructions for the single tank system above. All three ball valves above the heaters (COMPONENT #24, 25 & 26 FIGURES 15 & 16) must have the valve handles placed in the horizontal position. See Figures 19c 100% Utility Power and 19d.

7) ISOLATING THE MAJOR COMPONENTS AND SYSTEM SHUT DOWN PROCEDURES

Your SolaRay solar water heating system is designed so that the key components can be easily isolated for emergency repairs or routine maintenance. By shutting a single valve you can isolate the entire system from the pressurized cold water supply line

(COMPONENT #23, FIGURES 15 & 16). In the case of a storage tank or fitting leak immediately shut this valve and call your installation contractor for service.

The collector loop can be isolated from the solar storage tank by closing isolation ball valves (COMPONENT #10 & 5 FIGURES 15 & 16.) If the pressure in this loop drops or you find a glycol leak shut these valves and contact your installation contractor. Turn the circulating pump off by setting the controller to the "off" position.

In two tank systems the solar storage tank can be isolated from the back-up water heater.

Set the valve handle on the three way ball valve (COMPONENT #24, FIGURES 15 & 16) to the horizontal position and close the isolation ball valve (COMPONENT #25, FIGURES 15 & 16). By closing these two valves the tank can be serviced or replaced. The operation of the back-up water heater will not be effected.

The back-up water heater in two tank systems also can be isolated from the rest of the system. Close the cold water supply line ball valve (COMPONENT #23, FIGURES 15 & 16) and set the three way valve handle above the conventional water heater (COMPONENT #26, FIGURES 15 & 16) to the vertical position. Set the two way ball valve handle (COMPONENT #30, FIGURES 15 & 16) directly above the heater to the horizontal position.

8) SUMMER VACATION RECOMMENDATIONS AND PROCEDURES

Solar water heating systems can build up very high temperatures when there is no daily draw on the system. If a short summer vacation is planned, the SunEarth differential temperature controller has a Vacation Function which, when activated, will dissipate heat at night See control manual. Remember to de-activate this function upon your return!

During extended summer vacations (4 weeks or more) it is advisable to either cover the solar collectors with an opaque material or to manually drain the collector loop HTF. SunEarth recommends that you cover the collectors if practical.

If you choose to drain the HTF in the collector loop follow these steps:

8.1 Turn the controller to the "off" position Fig.16 (COMPONENT #18, FIGURES 15 & 16).

8.2 Connect one end of a garden hose to the purge/drain valve (COMPONENT #11 FIGURES 15 & 16) and place the other end in a five gallon bucket. Open both the purge/drain valve and the upper fill valve and gravity will drain the heat transfer fluid into the bucket. If the HTF is being disposed of, a licensed recycler, reclaimer or incinerator must dispose of the Dowfrost HD.

⚠WARNING: DO NOT DUMP DOWFROST HD INTO A STORM SEWER, ON THE GROUND OR INTO ANY BODY OF WATER. BE CAREFUL. THE HTF MAY BE EXTREMELY HOT!

8.3 If the system is installed with an optional time clock make sure the clock is not preset to go "ON" during your absence. If you have a mechanical time

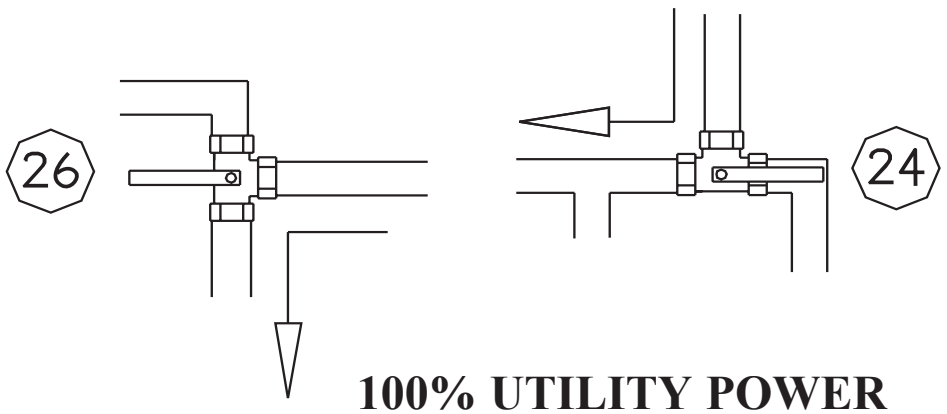


fig. 19c

switch, remove the "on" tripper from the clock face (COMPONENT #33, FIGURES 15& 16).

When you return home contact your service contractor to recharge the system with HTF. After the system has been recharged, set the controller to the "automatic" position. Reset the time switch if necessary.

9) MAINTENANCE AND TROUBLESHOOTING

The following simple procedures are intended to optimize the performance of your SolaRay solar water heating system and also to extend the life of the primary components.

9.1 Fluid Quality: It is extremely important to monitor the quality of the Dowfrost HD HTF on a periodic basis. The chemical composition of the heat transfer fluid may change over time. System pH must be maintained between 8 and 10 to avoid damage to the collector loop and absorber plate piping.

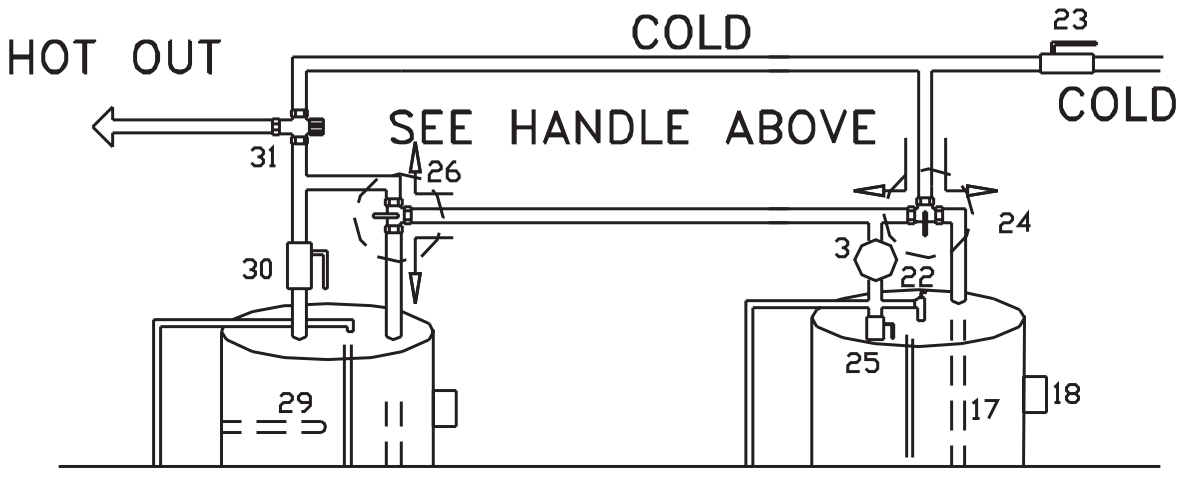
The specified glycol HTF is Dow Chemical "Dowfrost HD". Technical and engineering data for Dowfrost HD is available at www.Dow.com. Ask your installation contractor to establish a maintenance schedule to inspect, balance or replace the glycol HTF as needed.

9.2 The second most important component in your system, at least from a longevity standpoint, is often ignored and never seen. We are referring to the sacrificial "anode rod" installed in your solar storage tank (COMPONENT #20, FIGURES 15 & 16). Typically constructed from magnesium, anode rods are installed in "glass lined" water heaters and storage tanks to inhibit corrosion.

As the name implies, the "sacrificial" anode rod is consumed so that the tank lining is not. At a certain point in the process, the anode rod is no longer completely effective and the corrosive processes begin to eat away at the tank's glass lining. In time the solar storage tank, like any other gas or electric water heater, will begin to leak. The process is not reversible and the tank must be replaced.

System temperatures and water quality affect the rate at which the anode rod is consumed. In general, the higher the average system temperature the faster the rate of corrosion. By changing the anode rod after the fifth year of system operation, and every three to five years thereafter, it is possible to extend the life of the solar storage tank. Periodic replacement of the anode rod in your solar storage tank can significantly extend the tank life.

9.3 The solar storage tank also should be flushed annually to minimize sediment build-up on the bottom of the tank. If you live in an area with high mineral content in your water, flush the tank on a



VALVE POSITION DIAGRAM
2-TANK SYSTEM

fig. 19d

semi-annual basis. Disconnect the power to the solar tank at the circuit breaker or time switch (if present) before flushing. Turn the controller to the off position.

Open the flush valve on the bottom of the storage tank (COMPONENT #15, FIGURES 15 & 16) and drain a sufficient volume of water to eliminate the sediment. After the procedure is complete make sure the tank is completely full of water before restoring power to the thermostat and heating element. Turn the controller to the "on" position.

9.4 If you live in a dusty climate it is a good idea to wash off the dirt that settles on the collector glass once a month. Clean glass allows the collector to maintain a high level of thermal performance.

9.5 Check the exterior pipe insulation annually and patch or repair any exposed surfaces or degraded areas. Repaint as necessary with high quality exterior latex paint.

9.6 In the unusual instance of collector glass breakage, the glass should be replaced immediately. This will reduce the likelihood of water accumulating inside the collector and deteriorating the insulation. Contact your installation contractor.

9.7 If you detect a HTF or water leak, or the collector loop pressure drops unexpectedly, contact your installation contractor immediately to diagnose the problem and recharge the system.

9.8 If it's been a sunny day and you don't have hot water, first make sure that the controller is set in the automatic position. If the controller is properly set and the pump has not been running, unplug the line cord from the controller receptacle and plug the pump directly into a nearby 115 volt outlet. If the pump does not run it may need to be replaced. If the pump does run when plugged directly into the wall outlet, the problem may be located in the controller or one of the temperature sensors. Contact your installation contractor for service.

9.9 If you have a full tank of hot water before bed and the solar storage tank is cold in the morning, the check valve (COMPONENT #4, FIGURES 15 & 16) may not be seating correctly and should be cleaned or replaced. Also make sure that the circulating pump is not running at night. If the pump is running and the controller displays questionable temperatures at the collector or tank (ie. 180^{O}F tank and 45^{O}F collector), check both sensors using a resistance meter to see if they are correctly calibrated. If you find a defective sensor replace it immediately.

Note that in a two tank system nighttime heat loss will be harder to detect, especially if you are operating in the solar preheat mode. Check the line thermometers (if installed) in the collector loop piping to detect night thermosiphoning.

9.10 If the weather is poor and the auxiliary heating element will not fire, the bright red reset button on the thermostat may have to be depressed to be reset. Single tank systems have one heating element and thermostat. Double tank systems with conventional electric water heaters have two heating elements and thermostats (COMPONENT #29, FIGURE 16).

⚠ DANGER: NEVER REMOVE THE PROTECTIVE ACCESS PLATE ON THE EXTERIOR OF THE SOLAR STORAGE TANK OR CONVENTIONAL WATER HEATER WITHOUT DISCONNECTING THE 230 VOLT POWER SUPPLY AT THE CIRCUIT BREAKER.

After the circuit breaker has been turned off, remove the access plate on the storage tank or water heater and depress the red reset button on the thermostat. If it clicks when depressed the heating element should fire immediately when you reconnect the circuit breaker. It the reset button does not click and you do not have hot water after one hour, the heating element or thermostat may be defective. Contact your installation contractor for service.

In two tank systems the conventional electric water heater will be wired for electrical back-up. The solar tank will serve solely as a storage tank and will not be wired.

10) SOLARAY SYSTEM COMPONENT PARTS

See Figures 15 and 16 for the location of the specific components numbered below.

1) SunEarth Solar Collector(s): Absorbs the sun's heat energy and transfers this heat to the HTF circulating through the collector.

2) Collector Sensor: Wired to the system controller. Works in conjunction with the tank sensor to automatically turn your circulating pump on and off at preset temperature differentials.

3) Optional Tank and Line Thermometers: Used to determine proper system operation. Line thermometers will show an approximate 5 - 12° temperature difference between the collector supply and return lines on sunny days. In a single tank system the tank thermometer will read the temperature of the water after the mixing valve feeding your fixtures. In two tank systems the thermometer will read the finished solar tank temperature.

4) Check Valve: This valve is installed to stop or minimize convective evening heat loss in the system. The heat in the solar storage tank will rise through the collector loop piping in the evening into the much cooler solar collector and dissipate heat unless prevented from doing so by a check valve. Check valves are also sometimes referred to as one way valves or non-return valves. A separate check valve is not required if there is an integral check valve within the pump.

5) Isolation Ball Valve: Used in conjunction with component No. 10 to isolate the solar collector loop from the solar storage tank.

6) Pressure Relief Valve: Will release glycol loop HTF at 125 PSI. If this valve opens and HTF fluid is expelled contact your contractor immediately. This valve also can be opened to drain the HTF from the charged glycol loop for replacement.

7) Pressure Gauge: Indicates the pressure in the charged glycol collector loop.

8) Expansion Tank: Pre-charged with air to allow for the expansion and contraction of the glycol HTF as it heats and cools.

9) Charge Valve: Used to charge the collector loop with glycol and also to eliminate air from the system.

10) Isolation Ball Valve: Used in conjunction with component No. 5 to isolate the solar collector loop from the solar storage tank. Also used with the charge valves to fill and pressurize the collector glycol loop (Nos. 9 and 11).

11) Drain/Purge Valve: Used to charge the collector loop with glycol, purge air from the loop and drain the heat exchange fluid.

12) Isolation Ball Valve: When closed in conjunction with No. 14 will isolate the circulation pump for repair or replacement.

13) Circulating Pump: Circulates the HTF through the collector loop.

14) Isolation Ball Valve: When closed in conjunction with No. 12 will isolate the circulation pump for repair or replacement.

15) Flush Valve: Used to drain the solar storage tank and to flush sediment from the tank on an annual basis.

16) Tank Sensor: Wired to your controller. Works in conjunction with the collector sensor to turn your circulating pump on and off at preset temperature differentials.

17) Cold Water Dip Tube: Forces incoming city cold water to the bottom of the solar storage tank to prevent mixing with the warm water at the top of the tank.

18) Differential Temperature Controller: Automatically turns the circulating pump on and off when there is sufficient heat to be gained from the solar operation. The controller also may be set to limit high temperature build up in the solar storage tank.

19) Heat Exchanger: Transfers heat from the solar collector loop to the potable water in the solar storage tank. The heat exchanger is double walled and vented. If a leak in the heat exchanger piping occurs there is no possibility that the potable water in your solar storage tank can be contaminated with the glycol HTF.

20) Anode Rod: The “sacrificial” anode rod is installed in your solar storage tank to prevent corrosion to the tank lining by neutralizing aggressive water action. Anode rods have a finite life and require periodic replacement depending on annual tank temperatures and water quality. Determine a replacement schedule with your installation contractor.

21) Heating Element & Tank Thermostat: The solar storage tank is equipped with an auxiliary 4500 watt, 230 volt electrical heating element. The thermostat controls the temperature setting of the auxiliary heating element.

22) Temperature and Pressure Relief Valve:

Universally required by the plumbing code on water heaters. Will automatically release and dump water at either 150 PSI of pressure or 210° F in temperature.

23) Cold Water Supply Line Isolation Ball Valve: When open allows potable water to fill the solar storage tank or back-up water heater. When closed isolates the solar storage tank and back-up water heater from the pressurized city cold water supply line.

24) Three Way Ball Valve: Used in conjunction with component No. 26 to establish the proper mode of system operation.

25) Isolation Ball Valve: Used in conjunction with component No. 24 to completely isolate the solar storage tank for repair or replacement as necessary.

26) Three Way Ball Valve: Used in conjunction with component No. 24 to establish the proper mode of system operation.

27) Cold Water Dip Tube: See No.16 above.

28) Anode Rod: See No. 18 above.

29) Heating Elements and Thermostats: See No. 19 above. In a two tank system the back-up electric water heater has two heating elements and two thermostats.

30) Temperature and Pressure Relief Valve: See No. 22 above.

31) Optional Isolation Ball Valve. Use with component No. 26 to completely isolate the back-up water heater for repair or replacement.

32) Mixing Valve: Automatically blends hot water from the solar storage tank with incoming city cold water to an acceptable set point. A mixing valve must be installed on every SolaRay solar water heating system.

33) Optional Time Switch: Allows you to automatically or manually turn the auxiliary heating element in the solar storage tank on and off. A time switch is a highly recommended option.

11) ESTIMATED COMPONENT LIFE

You can expect a long useful life from the primary components in your SolaRay solar water heating system by adhering to the routine service and maintenance tips provided above.

The SunEarth solar collectors have a design life of 25 to 30 years. The HTF must be maintained as specified in this manual to maximize collector life. The solar storage tank should last 10 to 20 years in most water quality areas provided the anode rod is periodically replaced. Grundfos wet rotor 115 VAC circulator pumps should last 8 to 15 year before needing replacement. Like EPA mileage estimates for automobiles, these component design lives represent average figures for closed loop forced circulation systems of this type installed in the United States.

To obtain warranty service contact your installation contractor or call SunEarth Inc. for the name of an authorized service agent near you.

Propylene Glycol Maintenance Schedule	
Date Of Installation:	_____
Date Of Service:	_____
Date Of Service:	_____
Date Of Service:	_____
Date Of Service:	_____

Section 12

SunEarth Inc.
Solaray AC OG-300 System Certification
Approved Primary Components Package

1. SunEarth Empire or SunBelt Liquid Flat Plate Collectors

Models: EP-21, EP-24, EP-32, EP-40, EC-21, EC-24, EC-32, EC-40

2. SunEarth Solar Strut or RexRack Mounting Hardware

Per SunEarth Manuals, Standard Residential Drawings, and/or Plan Sets

3. SunEarth, Rheem, or Ruud Solar Storage Tanks with Double Wall Heat Exchanger and Auxiliary 4,500 Watt Heating Element

Models: SU80HE-1, SU120HE-1, 81V80HE-1, 81V120HE-1, RSPE80HE-1, RSPE120HE-1

4. Differential Temperature Controls

Models: SunEarth SETR 0301 U, Steca TR 0301 U, Goldline GL-30-X217, Goldline GL-30-X216

5. Cast Iron Circulating Pumps with Integral Check Valve:

See appended Pump Sizing Chart

6. Stainless Steel and Bronze Circulating Pump with Integral Check Valve:

See appended Pump Sizing Chart

7. Thermostatic Mixing Valve

Models: Cash Acme Heatguard 110-D or Approved Equal.

An approved as equal mixing valve must meet ASSE Standard 1017, be CSA and IAPMO approved, and shall have a range of selectability of at least 18ºF (10ºC) and shall include a set point no higher than 122ºF (50ºC). In jurisdictions that require 100% lead free valves on the potable side of the solar water heating system, use Watts 3/4 LFMMV-M1-US EDP #0559118 or approved equal.

8. Heat Transfer Fluid

Dow Chemical Dowfrost HD or Approved Equal

9. Expansion Tank (Glycol Side)

Models: Amtrol Extrol 30 or Approved Equal.

Equal must be approved by the manufacturer for use with propylene glycol.

10. Pipe Insulation and Protective Coatings:

Rubatex Insult-Tube 180 or Approved Equal.

11. Pressure Gauge:

Winters Q804 or Approved Equal.

12. Ball, TPR, PR, Check, Specialty Valves:

Watts, B & K, Webstone, Cash Acme, Nibco, Arrowhead Brass, or Approved Equal

13. Copper Tubing, Copper and Brass Fittings:

Mueller, Cerro, Cambridge Lee, Elkhart or Approved Equal

14. Sensor Wire:

SunEarth, Honeywell/Genesis, Belden or Approved Equal.

Wire must be no less than 18/2 AWG.

System Operating Parameters:

The pressure in the solar collector loop should be within 20 - 50 PSI.

The flow rate in the collector loop should be between 0.8 – 5 GPM.

The temperature difference between the collector outlet sensor and the solar tank sensor should be between 4 – 30 F degrees when the system is operational.

Section 13
80 Gallon Cast Iron Pump Sizing Chart

Cast Iron Pump Sizing: 80 Gal				1/2" Type L Copper Piping	
System 1:		Friction			
	80 Gal Hx Tank	1.300			
	1 each 4X10	0.009			
	100' 1/2" L	2.450		1 GPM @ 5' TDH	
	1 GPM			**GRUNDFOS**	**TACO**
	misc	1.000		UPS15-58FC	006-IFC
				Speed 1	BZ Only
	Total	4.759			
	Round up/off	5.000	feet TDH		

System 2:					
	80 Gal Hx Tank	4.800			
	2 each 4X8	0.012			
	100' 1/2" L	5.000		1.6 GPM @ 11' TDH	
	1.6 GPM			**GRUNDFOS**	**TACO**
	misc	1.250		UPS15-58FC	008-IFC
				Speed 1	
	Total	11.062			
	Round up/off	11.000	feet TDH		

Cast Iron Pump Sizing: 80 Gal				3/4" Type L Copper Piping	
System 3:		Friction			
	80 Gal Hx Tank	1.300			
	1 each 4X10	0.009			
	100' 3/4" L	0.440		1 GPM @ 3' TDH	
	1 GPM			**GRUNDFOS**	**TACO**
	misc	1.000		UPS15-58FC	003-IFC
				Speed 1	BZ Only
	Total	2.749			
	Round up/off	3.000	feet TDH		

System 4:					
	80 Gal Hx Tank	4.800			
	2 each 4X8	0.012			
	100' 3/4" L	1.000		1.6 GPM @ 7' TDH	
	1.6 GPM			**GRUNDFOS**	**TACO**
	misc	1.000		UPS15-58FC	006-IFC
				Speed 1	BZ Only
	Total	6.812			
	Round up/off	7.000	feet TDH		

UPS = 3 Speed Pump
FC = Flange Connection, Integral Check Valve
e.g. Grundfos UPS15-58FC

IFC = Intergral Flow Check (valve)
e.g. Taco 006-IFC

120 Gallon Cast Iron Pump Sizing Chart

Cast Iron Pump Sizing: 120 Gal				**1/2" Type L Copper Piping**	
System 5:		Friction			
	120 Gal Hx Tank	1.600			
	2 each 4X8	0.012			
	100' 1/2" L	5.000		1.6 GPM @ 8' TDH	
	1.6 GPM			**GRUNDFOS**	**TACO**
	misc	1.000		UPS15-58FC	006-IFC
				Speed 1	BZ Only
	Total	7.612			
	Round up/off	8.000	feet TDH		

System 6:					
	120 Gal Hx Tank	5.700			
	2 each 4X10	0.018			
	100' 1/2" L	8.110		2 GPM @ 15' TDH	
	2 GPM			**GRUNDFOS**	**TACO**
	misc	1.500		UPS15-58FC	008-IFC
				Speed 2	
	Total	15.328			
	Round up/off	15.000	feet TDH		

Cast Iron Pump Sizing: 120 Gal				**3/4" Type L Copper Piping**	
System 7:		Friction			
	120 Gal Hx Tank	5.700			
	2 each 4X8	0.012			
	100' 3/4" L	1.000		1.6 GPM @ 8' TDH	
	1.6 GPM			**GRUNDFOS**	**TACO**
	misc	1.000		UPS15-58FC	006-IFC
				Speed 1	BZ Only
	Total	7.712			
	Round up/off	8.000	feet TDH		

System 8:					
	120 Gal Hx Tank	5.700			
	2 each 4X10	0.018			
	100' 3/4" L	1.440		2 GPM @ 9' TDH	
	2 GPM			**GRUNDFOS**	**TACO**
	misc	1.500		UPS15-58FC	005-IFC
				Speed 1	008-IFC
	Total	8.658			
	Round up/off	9.000	feet TDH		

Section 14
80 Gallon Stainless And Bronze Pump Sizing Chart

Pump Sizing Guide		**80 Gal**		**1/2" Type L Copper Piping**	
System 1:		Friction			
	80 Gal Hx Tank	1.300			
	1 each 4X10	0.009			
	100' 1/2" L	2.450		1 GPM @ 5' TDH	
	1 GPM			**GRUNDFOS**	**TACO**
	misc	1.000		UP15-10BUC5	006-IFC
				Single Speed	
	Total	4.759			
	Round up/off	5.000	feet TDH		

System 2:		Friction			
	80 Gal Hx Tank	4.800			
	2 each 4X8	0.012			
	100' 1/2" L	5.000		1.6 GPM @ 11' TDH	
	1.6 GPM			**GRUNDFOS**	**TACO**
	misc	1.250		UPS15-55SUC	008-IFC
				Speed 2	
	Total	11.062		or UP15-42BUC5	
	Round up/off	11.000	feet TDH		

Pump Sizing Guide		**80 Gal**		**3/4" Type L Copper Piping**	
System 3:		Friction			
	80 Gal Hx Tank	1.300			
	1 each 4X10	0.009			
	100' 3/4" L	0.440		1 GPM @ 3' TDH	
	1 GPM			**GRUNDFOS**	**TACO**
	misc	1.000		UP15-10BUC5	003-IFC
				Single Speed	
	Total	2.749			
	Round up/off	3.000	feet TDH		

System 4:		Friction			
	80 Gal Hx Tank	4.800			
	2 each 4X8	0.012			
	100' 3/4" L	1.000		1.6 GPM @ 7' TDH	
	1.6 GPM			**GRUNDFOS**	**TACO**
	misc	1.000		UPS15-55SUC	006-IFC
				Speed 1	
	Total	6.812			
	Round up/off	7.000	feet TDH		

BUC = Bronze Volute Union Connection, Integral Check Valve
SUC = Stainless Volute Union Connection, Integral Check Valve
e.g. Grundfos UPS15-55SUC

120 Gallon Stainless And Bronze Pump Sizing Chart

Pump Sizing Guide		120 Gal		1/2" Type L Copper Piping	
System 5:		Friction			
	120 Gal Hx Tank	1.600			
	2 each 4X8	0.012			
	100' 1/2" L	5.000		1.6 GPM @ 8' TDH	
	1.6 GPM			GRUNDFOS	TACO
	misc	1.000		UPS15-55SUC	006-IFC
				Speed 1	
	Total	7.612			
	Round up/off	8.000	feet TDH		

System 6:					
	120 Gal Hx Tank	5.700			
	2 each 4X10	0.018			
	100' 1/2" L	8.110		2 GPM @ 15' TDH	
	2 GPM			GRUNDFOS	TACO
	misc	1.500		UPS15-55SUC	008-IFC
				Speed 3	
	Total	15.328		UP15-42BUC5	
	Round up/off	15.000	feet TDH		

Pump Sizing Guide		120 Gal		3/4" Type L Copper Piping	
System 7:		Friction			
	120 Gal Hx Tank	5.700			
	2 each 4X8	0.012			
	100' 3/4" L	1.000		1.6 GPM @ 8' TDH	
	1.6 GPM			GRUNDFOS	TACO
	misc	1.000		UPS15-55SUC	006-IFC
				Speed 1	
	Total	7.712			
	Round up/off	8.000	feet TDH		

System 8:					
	120 Gal Hx Tank	5.700			
	2 each 4X10	0.018			
	100' 3/4" L	1.440		2 GPM @ 9' TDH	
	2 GPM			GRUNDFOS	TACO
	misc	1.500		UPS15-55SUC	005-IFC
				Speed 1	008-IFC
	Total	8.658			
	Round up/off	9.000	feet TDH		

Section 15
SOLARAY SYSTEM MODEL NUMBERS

SINGLE TANK SYSTEMS – Electric Auxiliary

TE32P-80-1
TE32C-80-1
TE40P-80-1
TE40C-80-1
TE48P-80-1
TE48C-80-1
TE64P-80-1
TE64C-80-1
TE80P-80-1
TE80C-80-1
TE40P-120-1
TE40C-120-1
TE48P-120-1
TE48C-120-1
TE64P-120-1
TE64C-120-1
TE80P-120-1
TE80C-120-1
TE32P-80-N-1
TE32C-80-N-1
TE64P-80-N-1
TE64C-80-N-1
TE64P-80-N-1
TE64C-80-N-1
TE64P-120-N-1
TE64C-120-N-1

TWO TANK SYSTEMS–Electric Auxiliary

TE32P-80-2
TE32C-80-2
TE40P-80-2
TE40C-80-2
TE48P-80-2
TE48C-80-2
TE64P-80-2
TE64C-80-2
TE80P-80-2
TE80C-80-2
TE40P-120-2
TE40C-120-2
TE48P-120-2
TE48C-120-2
TE64P-120-2
TE64C-120-2
TE80P-120-2
TE80C-120-2

SINGLE TANK SYSTEMS – Tankless Gas Auxiliary

TE32P-80-TLG
TE32C-80-TLG
TE40P-80-TLG
TE40C-80-TLG
TE48P-80-TLG
TE48C-80-TLG
TE64P-80-TLG
TE64C-80-TLG
TE80P-80-TLG
TE80C-80-TLG
TE40P-120-TLG
TE40C-120-TLG
TE48P-120-TLG
TE48C-120-TLG
TE64P-120-TLG
TE64C-120-TLG
TE80P-120-TLG
TE80C-120-TLG

TWO TANK SYSTEMS–Gas Auxiliary

TE32P-80-2G
TE32C-80-2G
TE40P-80-2G
TE40C-80-2G
TE64P-80-2G
TE64C-80-2G
TE64P-80-2G
TE64C-80-2G
TE80P-80-2G
TE80C-80-2G
TE40P-120-2G
TE40C-120-2G
TE48P-120-2G
TE48C-120-2G
TE64P-120-2G
TE64C-120-2G
TE80P-120-2G
TE80C-120-2G
TE48-80-75G
TE32P-80-N-2G
TE32C-80-N-2G
TE64P-80-N-2G
TE64C-80-N-2G

Example: TE64C-80-2
T= Tank Type, Double Wall Vented Heat Exchanger
E=Empire Series Collectors
64=Nominal 64 Square Foot Collector Area
C=Chrome Absorber
80=80 Gallon Solar Tank
2=2 Tank System With Supplemental Electric Water Heater
N = No Supplemental Water Heater Blanket
TLG = Supplemental Tankless Gas Water Heater
G = Supplemental Tank Type Gas Water Heater
Note:To substitute a semi-selective absorber plate coating, delete "C" and add "P"

Section 16

SOLARAY AC OG-300 LABEL TEXT (REQUIRED TO BE LAMINATED BY THE INSTALLING CONTRACTOR AND ATTACHED TO THE TANK PLUMBING ACCORDINGLY)

VALVE NO. 23

COLD WATER SUPPLY LINE ISOLATION BALL VALVE

THIS VALVE IS NORMALLY OPEN AND ALLOWS POTABLE WATER TO FILL THE SOLAR STORAGE TANK. WHEN CLOSED THE SOLAR STORAGE TANK IS ISOLATED FROM THE PRESSURIZED CITY COLD WATER SUPPLY LINE PIPING.

VALVE NOS. 5 AND 10

VALVE S 5 AND 10 ARE NORMALLY OPEN. WHEN CLOSED THE SOLAR COLLECTOR LOOP PIPING IS ISOLATED FROM THE SOLAR STORAGE TANK.

VALVE NOS. 12 AND 14

VALVES 12 AND 14 ARE NORMALLY OPEN. WHEN CLOSED THE CIRCULATING PUMP IS ISOLATED FROM THE SOLAR COLLECTOR LOOP PIPING. **NEVER** SHUT THESE VALVES WHILE THE CIRCULATING PUMP IS IN OPERATION. TURN THE TOGGLE SWITCH, NO. 21, TO THE "OFF" POSITION.

VALVES NOS. 9 AND 11

VALVES 9 AND 11 ARE NORMALLY CLOSED. WHEN OPEN THEY ARE USED TO CHARGE AND DRAIN THE SOLAR COLLECTOR LOOP PIPING.

THE HEAT TRANSFER FLUID USED IN THIS SYSTEM IS DOWFROST HD PROPYLENE GLYCOL. IT MUST BE HANDLED AND DISPOSED OF IN ACCORDANCE WITH THE DOW CHEMICAL COMPANY MATERIAL SAFETY DATA SHEET MSDS NO. 000130. A COPY OF THE MSDS HAS BEEN PROVIDED WITH YOUR INSTALLATION MANUAL.

BE EXTREMELY CARFUL WHEN DRAINING THIS FLUID. IT MAY BE DISCHARGED AT A VERY HIGH TEMPERATURE AND/OR PRESSURE.

NO OTHER FLUID SHALL BE USED THAT WOULD CHANGE THE ORIGINAL CLASSIFICATION OF THIS SYSTEM. UNAUTHORIZED ALTERATIONS TO THIS SYSTEM COULD RESULT IN A HAZARDOUS HEALTH CONDITION.

FREEZE LABEL:

A 60% CONCENTRATION OF DOWFROST HD PROPYLENE GLYCOL AND DISTILLED WATER CAN PROTECT YOUR SOLARAY SYSTEM TO TEMPERATURES AS LOW AS -650° F. LESSER CONCENTRATIONS OF DOWFROST HD AND DISTILLED WATER WILL PROVIDE A LOWER LEVEL OF FREEZE PROTECTION.

PLEASE CONSULT SECTION 4.11.1 OF YOUR INSTALLATION MANUAL FOR SPECIFIC FREEZE TOLERANCE INFORMATION.

ADDITIONAL TWO TANK SYSTEM VALVES

VALVE NO. 25

THIS VALVE IS NORMALLY OPEN. WHEN CLOSED IN CONJUNCTION WITH VALVE NO. 22 WILL ISOLATE THE SOLAR STORAGE TANK FOR REPLACEMENT OR MAINTENANCE.

VALVE NO. 30

THIS VALVE IS NORMALLY OPEN. WHEN CLOSED IN CONJUNCTION WITH VALVES 22 AND 25 WILL ISOLATE THE BACK-UP WATER HEATER FOR REPLACEMENT OR MAINTENANCE

SUNEARTH INC.
Quality Solar Energy Products

TEN-YEAR LIMITED PRODUCT WARRANTY

This warranty only applies to the following SunEarth products (hereinafter SunEarth Products):

COLLECTORS: Empire, Imperial, SunWise, SunBelt and Custom Collectors
ABSORBERS: SunBurst and Custom Absorber Plates used in any glazed application
ICS AND DRAINBACK: CopperHeart ICS, CopperHeart Tanks, and CopperStor DrainBack Tanks

Under conditions of normal use and service the above SunEarth Products are warranted to the original, or subsequent users, for a period of **10 years** from the date of sale to the end user. SunEarth's liability for these products shall be limited to repairing or replacing at SunEarth's option, without charge, F.O.B. SunEarth's factory or an authorized SunEarth distributor or service center. SunEarth 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 set forth in this warranty.

+ The use of **ANY** of the above SunEarth Products for pool or spa heating is **NOT** covered by this warranty, **UNLESS** the pool or spa water is isolated from the above SunEarth Products through the use of a heat exchanger.

FIELD LABOR

Field labor to repair or replace any defective SunEarth Product is reimbursable as follows:

Year 1	$100/collector
Year 2 ~ 5	$75/collector
Year 6 ~ 10	$50/collector

FREIGHT AND SHIPPING EXPENSES

In the event of a valid warranty claim approved by SunEarth, SunEarth will pay for freight and shipping expenses as follows:

Year 1 of Warranty: SunEarth will pay the freight and shipping costs for the new or repaired SunEarth Product between SunEarth and the nearest local distributor, dealer, authorized service center, city, or shipping terminal.

After Year 1 of Warranty: Freight and shipping costs are the responsibility of the owner.

THIS WARRANTY DOES NOT APPLY

This warranty **does not apply** to the following: **(1)** conditions resulting from a failed component or part that is not part of the above listed SunEarth Products; **(2)** to damage caused by freezing conditions; **(3)** to conditions resulting from misuse, abuse, neglect, accident, or alteration; **(4)** to cosmetic discoloration of the collector framewall, absorber plate, or glazing over time; **(5)** to glass breakage; **(6)** to conditions resulting from the introduction of harmful chemicals, caustic fluids, or liquids deleterious to copper tubing, including improperly applied or maintained heat transfer fluids or chlorinated pool or spa water; **(7)** to SunEarth Products in which heat transfer fluids other than potable water or propylene glycol (DowFrost HD recommended) was used; **(8)** to propylene glycol pH levels above 10 or below 8; **(9)** to periods of

stagnation in excess of 30 days; **(10)** to excessive pressure; **(11)** to erosion corrosion of the copper tubing resulting from excessive flow rates; **(12)** to improper plumbing configurations that do not conform to SunEarth's manifolding requirements; **(13)** to clouding or condensation naturally resulting from temporary intrusions of moisture into the collector; **(14)** to conditions resulting from floods, earthquakes, winds, fire, lightning, or circumstances beyond SunEarth's control; **(15)** to damage caused by installation methods, including mounting, that do not conform to relevant national, state or local codes and ordinances, good industry practices, or to current applicable SunEarth manuals, diagrams, technical bulletins, or written installation instructions; **(16)** or to applications other than medium temperature (110 - 160F) domestic water heating.

If one of the above SunEarth Products is purchased outside the continental United States certain conditions of this warranty may **NOT** apply. Please contact your local SunEarth distributor or dealer for details.

LIMITED WARRANTY

EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY, THE ABOVE SUNEARTH PRODUCTS ARE 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.

LIMITATIONS OF REMEDIES

IN NO EVENT SHALL SUNEARTH BE LIABLE FOR ANY DAMAGES FOR LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES, ARISING OUT OF THE USE OR INABILITY TO USE THE ABOVE SUNEARTH PRODUCTS, OR FOR ANY CLAIM BY A THIRD 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

THIS WARRANTY CONSTITUTES THE ENTIRE, COMPLETE, FINAL, AND EXCLUSIVE AGREEMENT FOR THE SUNEARTH PRODUCTS LISTED ABOVE. THIS WARRANTY SUPERSEDES ANY PROPOSAL, AGREEMENT, OR REPSRESENTATION, OR ANY OTHER COMMUNICATION, EITHER WRITTEN OR ORAL, MADE BETWEEN SUNEARTH AND SUNEARTH'S DISTRIBUTORS OR DEALERS, OR BETWEEN SUNEARTH AND THE END CONSUMER.

HOW TO MAKE A CLAIM

To obtain service under this warranty, the product in question must be returned to the distributor or dealer of SunEarth products nearest you, or an authorized SunEarth service center. Each claim must be accompanied by documentation providing the following:

1) Owner's name, address, email address, and phone number
2) Installation contractor's name, email address, and phone number
3) Original sales receipt
4) Product model and serial number(s)
5) Date of installation
6) Date of failure
7) Reason for failure
8) Pictures of the suspected manufacturing defect – digital pictures of the suspected manufacturing defect also need to be submitted

If you have any warranty questions, contact your installation contractor or SunEarth at (909) 434-3100.

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