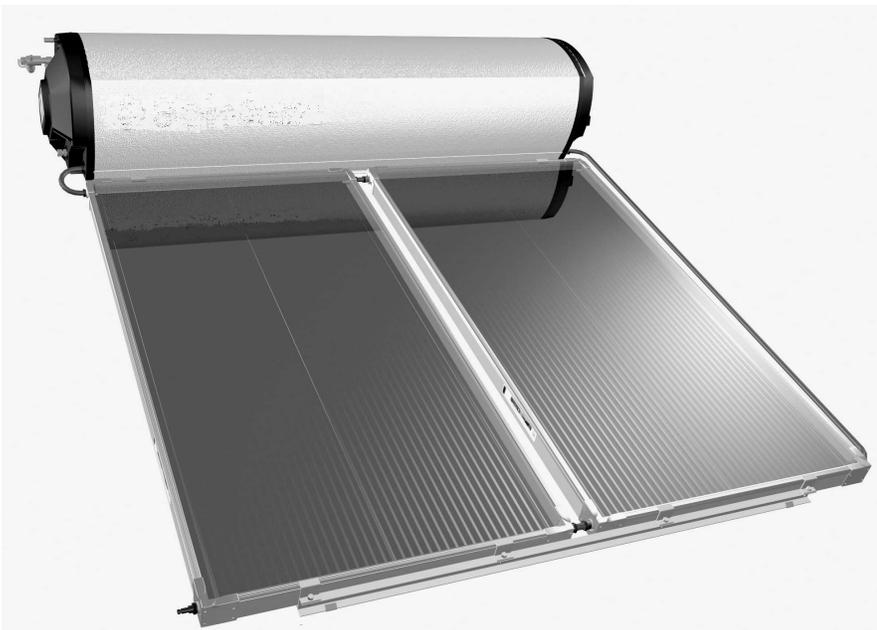


# Passive Solar Water Heating Systems



This Solar Water Heating system is for the models listed below:

RS80-42BP

RS47-21BP

The purpose of this manual is twofold: one, to provide the installer with the basic directions and recommendations for the proper installation and adjustment of the water heater; and two, for the owner-operator, to explain the features, operation, safety precautions, maintenance and troubleshooting of the water heater. This manual also includes a parts list.

It is very important that all persons who are expected to install, operate or adjust this water heater read the instructions carefully so they may understand how to perform these operations. If you do not understand these instructions or any terms within it, seek professional advice.

Any questions regarding the operation, maintenance, service or warranty of this water heater should be directed to the seller from whom it was purchased. If additional information is required, refer to the section on "If you need service."

**Do not destroy this manual. Please read carefully and keep in a safe place for future reference.**



**Recognize this symbol as an indication of Important Safety Information!**



**California Proposition 65 Warning:**  
This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.



## Safety Information

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## FOR YOUR RECORDS

Write the model and serial numbers here:

# \_\_\_\_\_  
# \_\_\_\_\_

You can find them on a label on the appliance.

Staple sales slip or cancelled check here.

Proof of the original purchase date is needed to obtain service under the warranty.



## READ THIS MANUAL

Inside you will find many helpful hints on how to use and maintain your water heater properly. Just a little preventive care on your part can save you a great deal of time and money over the life of your water heater.

You'll find many answers to common problems in the Before You Call For Service section. If you review our chart of Troubleshooting Tips first, you may not need to call for service at all.



## READ THE SAFETY INFORMATION

**Your safety and the safety of others are very important. There are many important safety messages in this manual and on your appliance. Always read and obey all safety messages.**



**This is the safety alert symbol. Recognize this symbol as an indication of Important Safety Information! This symbol alerts you to potential hazards that can kill or hurt you and others.**

All safety messages will follow the safety alert symbol and either the word "DANGER", "WARNING", "CAUTION" or "NOTICE".

These words mean:

**▲ DANGER**

**An imminently hazardous situation that will result in death or serious injury.**

**▲ WARNING**

**A potentially hazardous situation that could result in death or serious injury and/or damage to property.**

**▲ CAUTION**

**A potentially hazardous situation that may result in minor or moderate injury.**

**Notice:**

**Attention is called to observe a specified procedure or maintain a specific condition.**

# Introduction

---

Thank you for purchasing a solar water heating system. It is one of the most effective and trouble-free systems available today. In addition to reducing your water-heating bills, it will help preserve precious natural resources by using free energy from the sun.

As with an electric or gas water heater, your new solar water heating system operates automatically to ensure you will always have an ample supply of hot water. However, there are simple steps you can take to increase both its efficiency and service life.

This manual provides the manufacturers recommended procedures for Rheem Thermosiphon solar water-heating systems. The procedures are essential for correct installation, troubleshooting and maintenance.

Read each section of this manual thoroughly before beginning work on the system.

**▲CAUTION: Changes to the design or intended use of the Rheem Thermosiphon System will void the manufacturers warranty. Installation, troubleshooting, and maintenance must be performed by a qualified technician.**

This manual will help you get the most out of your solar water heating system. Please read it carefully when the installation is complete, and review it from time to time to refresh your memory about the service requirements and safety measures.

The Operation section of the manual contains important information regarding the system procedures as well as safety measures pertaining to the system. It is important that you follow these guidelines to ensure safe, efficient and trouble-free operation.

While the system requires very little maintenance, there will be a periodic need for some upkeep. The Maintenance section outlines those requirements for service, which you may do yourself, as well as those procedures best performed by a qualified service technician.

The Troubleshooting section contains steps you can take if the system is not performing, as it should.

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

The solar energy system described by this manual, when properly installed and maintained, meets the minimum standards established by the Florida Solar Energy Center, in accordance with Section 377.705, Florida Statutes. This certification does not imply endorsement or warranty of this product by the Florida Solar Energy Center or the state of Florida.

Your passive solar water heating system is one of the most efficient yet simple and trouble free water-heating systems in the world.

The components of the system include a water storage tank, solar collector panels, and a assortment of pipes and valves.

In locations which are subject to temperatures below 41°F, a mixture of specially developed Hartgard fluid and water circulates through the solar collector panels. This fluid is heated by the sun, then circulated through the jacket surrounding the water storage tank, heating the potable (drinking) water inside the storage tank. The Hartgard fluid is a non-toxic, food-grade liquid, which provides freeze protection for the closed loop heat transfer loop. It is colored blue to differentiate the closed loop fluid from the potable water supply.

**▲WARNING: Under no circumstances can any fluid other than Hartgard be used, alternate fluids could be hazardous to your health.**

This circulation of the Hartgard fluid is accomplished naturally, without the need for pumps, sensors or any moving parts. No moving parts mean fewer potential problems. These solar water heaters are referred to as closed loop systems and identified in the model number by the last two digits.

Your hot water is stored in a steel tank lined with two coats of Primaglaze® vitreous enamel (glass) and thickly insulated to help maintain the water temperature throughout the day and night.

To ensure your hot water supply is never depleted, the system is equipped with a backup heater or heating element. On the few days a year when there may be insufficient solar energy, you are still assured of all the hot water you will need.

If your system is your only source of hot water, there is one way to ensure a constant supply.

- a. You can leave the breaker ON all of the time and the heater will operate only when the water temperature falls below the thermostat temperature setpoint

## Introduction continued...

---

While your system is one of the most efficient available, there are two simple steps you can take to increase your water-heating cost savings.

### **Keep the use of the Backup Heater to a Minimum**

You can save the most money on your water-heating bills by using the backup heater on your system as little as possible. If the sun shines brightly between 10 am and 3 pm, enough heat will normally be generated to keep the water hot throughout the rest of the day and night.

However, on days when the sky is cloudy or when large quantities of hot water are being used, we suggest that the backup heater be left "ON" overnight to ensure adequate hot water the next morning.

### **Try to use Hot Water during Daylight Hours**

When possible, schedule heavy hot water use, such as dish washing, laundry and showers, in the middle of the day. If hot water usage occurs while the sun is up, the fresh (cold) water added to the storage tank is heated more quickly.

When water is used late in the day or at night, the fresh water entering the tank will be heated by the

element so hot water is available in the morning.

The Rheem Thermosiphon systems operate on the passive thermosiphon principle a 'closed loop' to provide fail-safe freeze protection up to -30°F of the collector closed loop. The closed loop consists of the solar absorbers, a single wall heat exchanger around the outside of the storage tank, and plumbing attachments.

Radiant energy from the sun heats the special long-life fluid in the solar collectors. As the fluid is heated, it rises into the tank heat exchanger and heats the potable water stored within. The hot potable water is stored in a well-insulated steel storage tank, which is lined with two coats of Primaglaze vitreous enamel for high temperature stability.

Flow of the closed loop fluid, using the passive thermosiphon principle, is accomplished without pumps, sensors or moving parts.

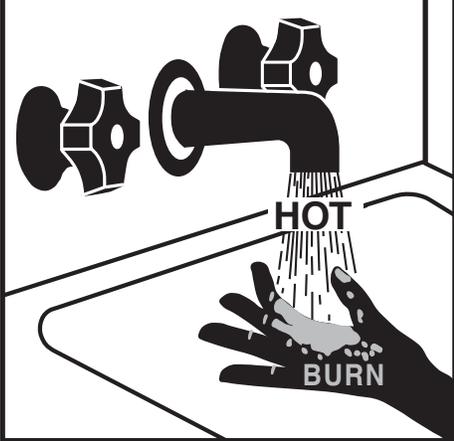
# IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.

## ⚠️ 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



Water temperature over 125°F can cause severe burns instantly or death from scalds.

Children, disabled and elderly are at highest risk of being scalded.

See instruction manual before setting temperature at water heater.

Feel water before bathing or showering.

Temperature limiting valves are available, see manual.

#### 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.

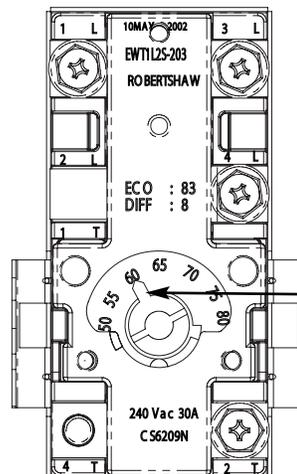
The temperature of the water in the water heater can be regulated by setting the temperature dial of the adjustable surface mounted thermostat located behind the left tank end cover.

**⚠️ 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 122°F (50°C) 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.

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.



Thermostat  
Dial Pointer

**⚠️ 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 Use and Care 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

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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

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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 Use and Care 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 a qualified technician.



READ AND FOLLOW THIS SAFETY INFORMATION  
CAREFULLY.

---

SAVE THESE INSTRUCTIONS

# Installing the water heater.

The location chosen for the water heater must take into consideration the following:

## Local Installation Regulations

This water heater must be installed in accordance with these instructions, local codes, utility codes, utility company requirements or, in the absence of local codes, the latest edition of the National Electrical Code.

It is available from some local libraries or can be purchased from the National Fire Protection Association, Batterymarch park, Quincy, MA 02269 as booklet ANSI/NFPA 70.

**⚠ WARNING:** Heat trace will not protect against pipe freezing in the event of power loss.

**⚠ WARNING:** Extended periods of cold weather, including ambient air temperatures below the limits specified on the right, may cause freezing in exposed parts of the system. It is the owner's responsibility to protect the system in accordance with these instructions if the air temperature is anticipated to approach the specified limits.

## Location

### Minimum Air Temperature

Rheem Thermosiphon systems must not be installed in areas where the outside air temperature can fall below 41°F continuously for more than 18 hours. Where outside air temperature falls lower than 41°F Rheem closed loop models must be installed. The collector closed loop fluid is freeze protected to -40°F.

If the outside air temperature is to fall below 32°F for more than 4

hours on the Rheem closed loop models, it is suggested that all potable water plumbing is installed with heat trace and insulated to protect against pipe freezing. In the event of a power failure, open a hot water faucet and allow a slow trickle of water to flow until power is restored.

Please contact your service technician for assistance and advice with protection against pipe freezing.

## Inspect Shipment

Inspect the water heater for possible damage. Check the markings on the rating plate of the water heater to be certain the power supply (Solar Electric Only) corresponds to the water heater requirements. Make sure all parts included with the solar water heater system are accounted for by comparing to the following list of parts.

## Water Storage Tank Specifications (Part Number RS80 & RS47)

Total Capacity ( Nominal)	48 Gallons	80 Gallons
Overall size ( L x W x H )	59" X 20" X 20"	90" X 20" X 20"
Nominal Working Pressure	15 - 145 PSI.	15 - 145 PSI
Weight Empty	143 lbs.	226 lbs.
Weight Installed	540 lbs.	877 lbs.
Immersion Element (Booster)	2.4 kW 220/240 V	2.4 kW 220/240 V

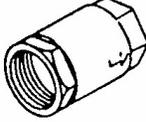
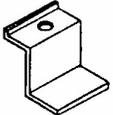
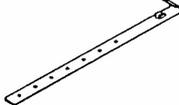
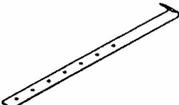
## Collectors (1 or 2)

Overall Size (L x W)	76" x 40"
Collector Model Number	RS-21BP
Nominal Area	21.3 sq. ft.
Weight Empty	84 lbs.
Weight Installed	96 lbs.
Plate-to-Plate Bonding	Electric Welding
Test Pressure	26 psi
Nominal Working Pressure	-0.2 to 11.5 psi

# Installing the water heater.

## System Parts ID List



Solar Collector 	3/4" Union Nut 	3/4" T/P Valve 	Fill Fitting 
Collector Nut 	18mm Union Cone 	3/4" Check Valve <b>(NOT INCLUDED)</b> 	Collector Hot Pipe 
Collector Plug 	Lag Screw (5/16" x 1 3/4") <b>(NOT INCLUDED)</b> 	3/4" Cold Water Expansion Valve <b>(NOT INCLUDED)</b> 	Collector Clamps 
3/4" Tail Plug 	Tempering Valve 	PR6 Jacket Relief Valve (includes "O" ring). 	Collector Extrusion 
3/4" Union 	3/4" Tee Adapter 	Collector Union 	Tank Clamp 
Collector Down Pipe 	1 Gallon Hartgard 	Collector Strap 	Tank Strap 

---

## Pre-Installation

This section will guide you to gather the necessary information to install the system correctly. Use it together with the Installation Checklist to identify all installation requirements.

These installation inspection procedures include;

- Review of local building codes for site requirements and specific guidelines for plumbing and electrical installation.
- Inspection of installation site.
- Completion of the Pre-installation Checklist, including customer's signature.

### Site Inspection Equipment

- Pre-Installation Inspection Checklist
- Pencil or pen
- Ladder
- Tape measure
- Flashlight
- Water pressure gauge
- Pitch gauge
- Compass

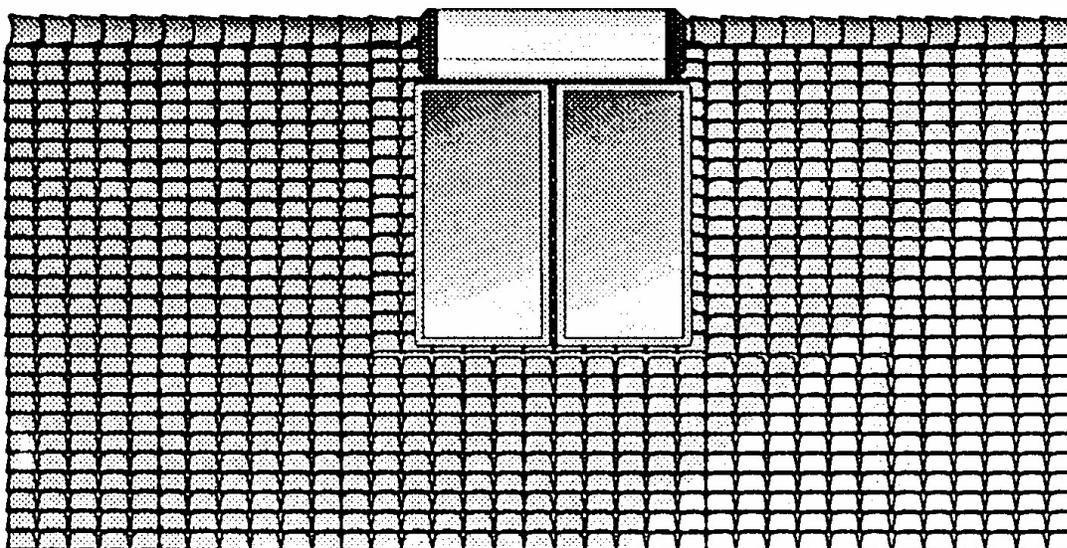
### Review Local Codes

- Review local codes and record on checklist:
- Area requirements

- Plumbing requirements
- Electrical requirements
- Roof support stress load and modification requirements (including engineering review, if necessary).
- **Obtain building plans, if possible, to help locate bearing walls and determine truss strength.**
- **Record extreme weather conditions on checklist;**
  - Heavy-snowfall areas require roof-ridge mount, see Figure below.
  - High-wind areas require an additional Bracing Kit.
  - Installation sites subject to winds of more than 50 m.p.h. require a specially engineered frame.
  - Cold areas need freeze protection for all domestic plumbing lines.

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Roof Ridge Mounts



Roof Edge

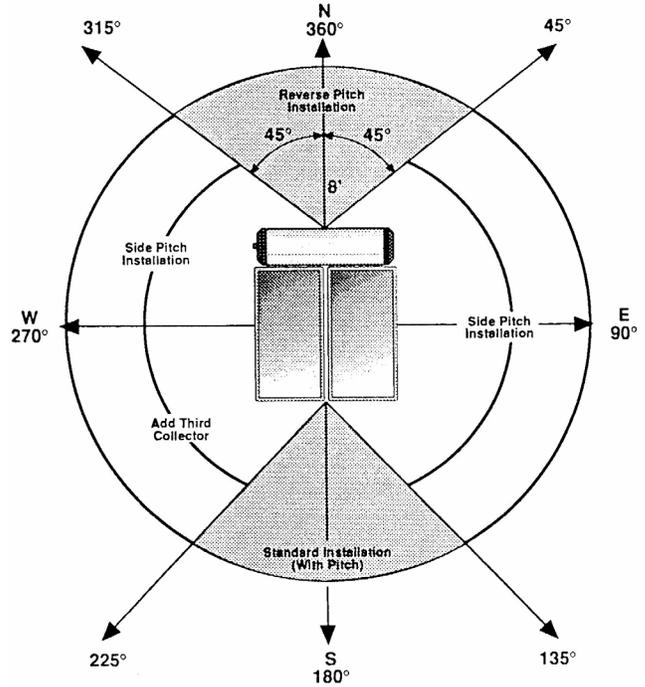
# Installing the water heater.

## System Placement Requirements

The system must face between 135 - 225° (Ideal direction is true South): (Refer to the Figure on the right).

Installations outside this range require either an additional collector or frame.

Site must be shade-free year-round and clear of obstructions.

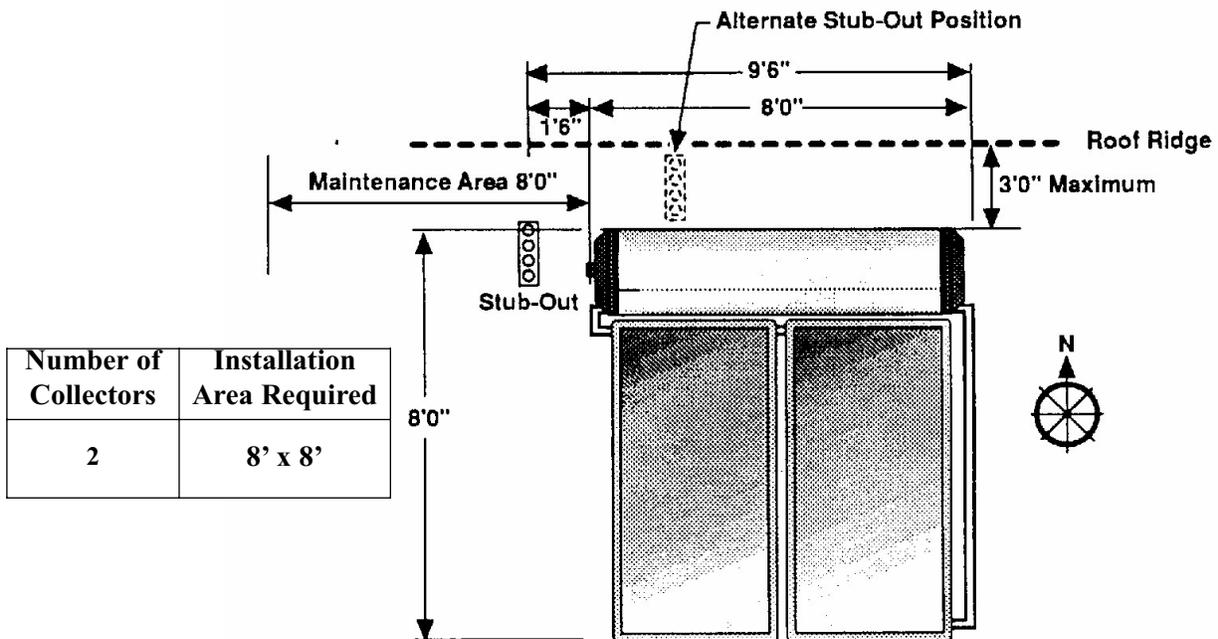


## Area Requirements for Collectors

### Plumbing/Electrical stub-out

- 1' 6" left side for roof-ridge mount,
- 1' 6" top or left side all others.
- Maintenance area: 8' on left side.

- All local code-required setbacks, heights, and distances from other structures, pipe vents and utilities must be followed.



Number of Collectors	Installation Area Required
2	8' x 8'

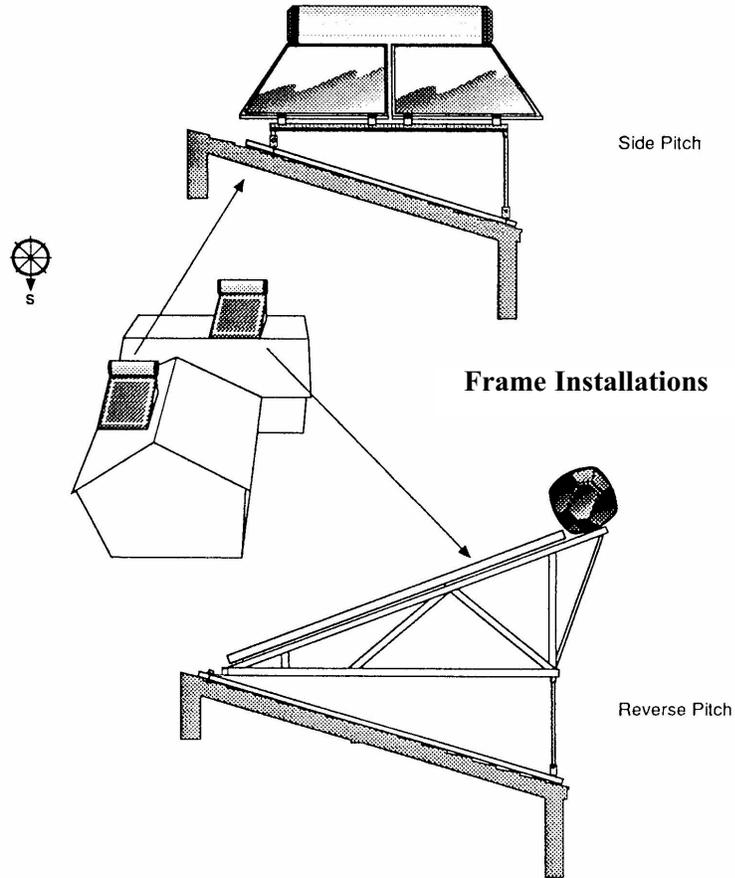
## Pitch Requirements

Correct operation requires a 15° - 45° pitch (slope). This can be done by using the roof slope itself or a frame

**⚠ CAUTION: DO NOT** install on a roof with a pitch beyond 45°.

Use pitch gauge and compass and complete the following steps. Record the results on the checklist.

- Record pitch and compass bearing of proposed installation site.
- Using table shown below, select number of collectors and correct type of installation.



Roof Installations			
Compass Bearing	Pitch	Mount	No. of Collectors
135° - 225°	14° - 45°	None	2
135° - 225°	0° - 15°	Frame	2
226° - 270°*	15° - 45°	None	2
5° - 134° 270° - 315°	15° - 45°	Side Pitch	2
0° - 44° 316° - 360°	15° - 35°	Reverse Pitch	2

**NOTICE:** A roof pitch beyond 30° requires additional bracing.

**NOTICE:** A crane may be necessary for installation.

\* If installed in this orientation, solar heater will not provide maximum solar heating capacity.

# Installing the water heater.

## Roof Survey

**NOTICE: A roof in poor condition may need replacement before the system is installed.**

Record the following on the checklist:

- The type of roofing material (tile, shingle, tar & gravel, metal, etc.).
- The condition of the roof. Note any repair requirements

needed prior to installation.

- Draw diagram (top view) as shown below, of installation area. Mark location of the system and stub-out.
- Using the table below, select the appropriate supporting structure for your solar system.

Roof Type	Installation Type	Supporting Structures
All types except sturdy tiles and metal	With pitch (standard)	4 runners and Collector Extrusion
Sturdy tiles or metal roof with No obstruction of water flow	With pitch (metal / sturdy tile)	Collector Extrusion only
All types	Side pitch	2 runners + Frame
All types	Reverse pitch	2 runners + Frame
All types	Flat / shallow pitch	2 runners + Frame

## Roof Support Requirements

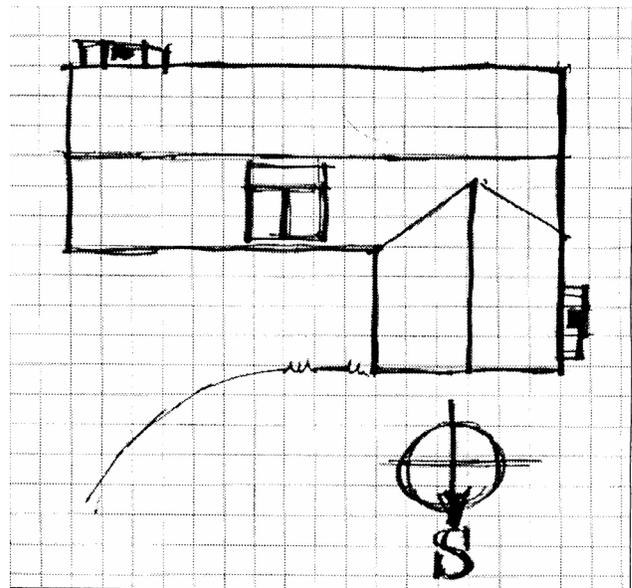
The system weighs up to 1089 lbs (80 Gallon System) when installed and filled. It may not be necessary to provide additional support but you must inspect the roof support system to determine if additional bracing is needed.

Record the following on the checklist.

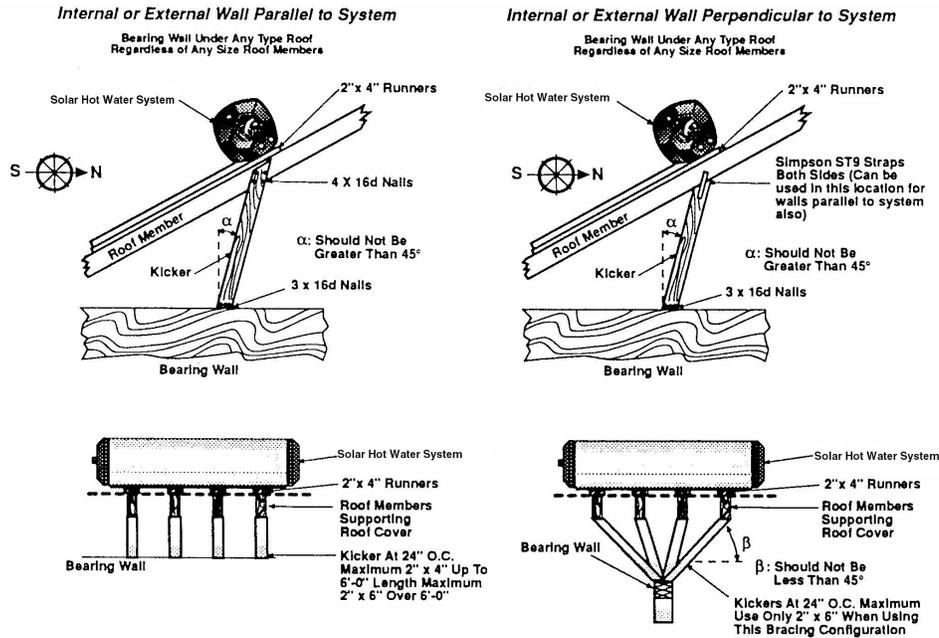
**▲CAUTION: If the following modifications do not apply to the installation site, an engineer must specify support modifications.**

### Conventional Roof Modifications;

- Locate the load bearing wall beneath installation site (refer to building plan if available) and indicate on the roof-site plan. If a load-bearing wall is not available, note this on the checklist.
- Review Figure at the top of the following page and select correct supports.

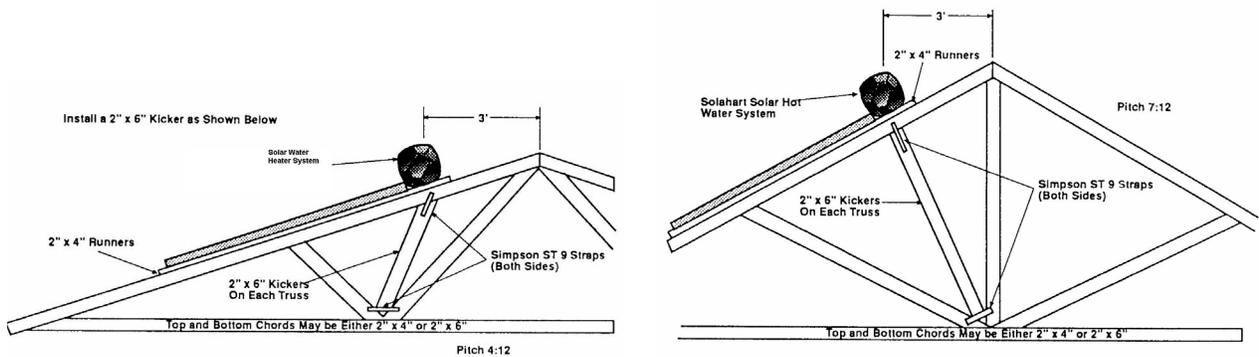


# Conventional Roof Modifications



# Truss Frame Modifications

Determine the correct truss frame modification using the figures shown below.



Allowable Spans for Trusses					
2" x 4" Top Chord	2" x 6" Top Chord	24" O.C. Kickers	Bottom Chord	Pitch	Roof Material
21"	32"	X	2"x4" or 2"x6"	3:12 <sup>1</sup>	Tile
24"	36"	X	2"x4" or 2"x6"	3:12 <sup>1</sup>	Shake
25"	38"	X	2"x4" or 2"x6"	4:12 <sup>2</sup>	Tile
28"	42"	X	2"x4" or 2"x6"	4:12 <sup>2</sup>	Shake
28"	36"	X	2"x4" or 2"x6"	7:12 <sup>3</sup>	Tile
30"	38"	X	2"x4" or 2"x6"	7:12 <sup>3</sup>	Shake

**NOTICE:** For truss spans >36", use double 2" x 6" kicker.

<sup>1</sup> Pitch of 3:12 or less    <sup>2</sup> Pitch of 4:12 to 6:12    <sup>3</sup> Pitch of 7:12 or greater

# Installing the water heater.

**Review the checklist for installation requirements.**

**Check the following before beginning installation.**

## Permits

Obtain required permits before installation.

## Work Force

An 80 gallon storage tank weighs up to 242 lbs empty, requiring a crew of two or more to install.

## Inventory

Review Section on Frames, included hardware, and all optional supplies before beginning installation.

Required Tools, Equipment and Supplies

## Basic Plumbing, Electrical and Carpentry Supplies

- Metric wrench (36 mm open end wrench)
- 12” pipe wrench
- Two 12” adjustable (crescent)
- Wrenches
- Water pressure gauge
- Crowbar
- Copper tubing cutter
- Soldering kit
- Caulking gun
- 24” Spirit (bubble) level
- Cable cutter / stripper
- 6” diagonal cutting and long nose pliers
- 100' Grounded extension cord
- Screwdriver Set (# 2 Philip’s, 1/4” Slotted)

- Tape measure (100 Foot)
- 16-Ounce claw hammer
- Marking pen
- Utility knife
- 3/8”-drive socket set
- 2 Extension ladders
- Flashlight / electric lantern
- Pipe vice / cutter / threader
- Volt, ohm, ammeter
- Hacksaw
- 1/2” Electric drill with bit set
- Skill Saw with standard and masonry blades
- Crane, if required
- 1” Wood-boring bit

## Consumable Supplies:

- Masking/duct tape
- Wood/sheet metal screws
- Dielectric pipe unions
- Waterproof sealing compound
- 5/16” Lag Screws, 1 3/4”, 2”, 3”, 6”, as required
- Washers
- Nails, 16g, or assorted, as required
- Silicone sealant
- 2' x 4' x 8'4” redwood, treated-wood or
- Unistrut runners, as required

## Customer Approval

- Review the checklist with the customer and discuss all installation requirements and procedures.
- Ask the customer to sign the checklist.

**NOTICE: This guide recommends minimum branch circuit sizing and wire size based on National Electric Code. Refer to the wiring diagrams in this manual for field wiring connections.**

## Branch Circuit Sizing and Wire Size Guide

Total Water Heater Wattage	Recommended Over Current Protection (fuse or circuit breaker amperage rating)				Copper Wire Size AWG Based on N.E.C. Table 310-16 (75°C)			
	208V	240V	277V	480V	208V	240V	277V	480V
3,000 or lower	20	20	15	15	12	12	14	14
4,000	25	25	20	15	10	10	12	14
4,500	30	25	25	15	10	10	10	14

## Electrical System Requirements

**NOTICE:**All wiring must conform to local codes or the latest edition of National Electrical Code ANSI/NFPA 70.

**⚠ WARNING:** Any wiring outside of the house should be rated for the appropriate weather conditions.

If the system is being used as a pre-heater to an existing water heater, the electrical review and installation may not be required.

A 240 Volt electrical breaker with appropriate amp rating is required to activate the Backup Heating Element located near or as part of the main circuit breaker/fuse panel.

The manufacturer's warranty does not cover any damage or defect caused by installation, attachment or use of any type of energy saving or other unapproved devices (other than those authorized by the manufacturer) into, onto or in conjunction with the water heater. The use of unauthorized energy saving devices may shorten the life of the water heater and may endanger life and property.

The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such

unauthorized devices.

Check the availability of a 240-volt, and an appropriately sized electrical breaker. A separate branch circuit with copper conductors, overcurrent protective device and suitable disconnecting means must be provided by a qualified electrician. If the breaker is not available, mark a location for a separate breaker.

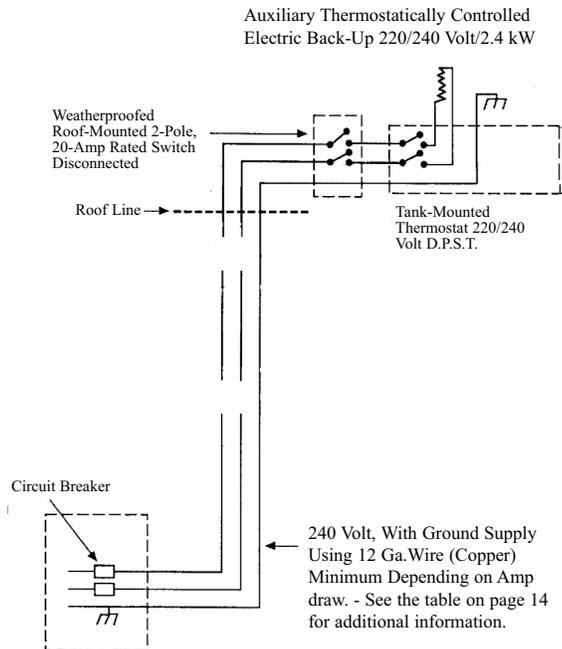
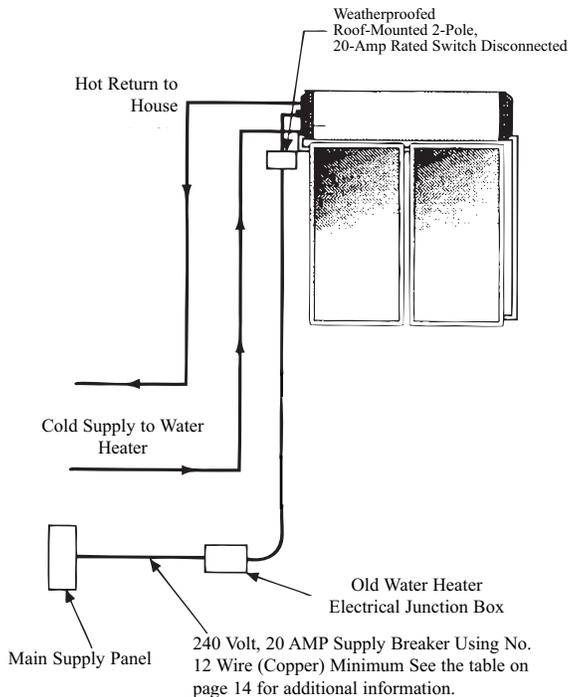
When replacing an existing electric water heater see the chart on page 14.

The voltage requirements and wattage load for the water heater are specified on the rating plate on the front of the water heater.

The branch circuit wiring should include either:

- Metallic conduit or metallic sheathed cable approved for use as a grounding conductor and installed with fittings approved for the purpose.
- Non-metallic sheathed cable, metallic conduit or metallic sheathed cable not approved for use as a ground conductor shall include a separate conductor for grounding. It should be attached to the ground terminals of the water heater and the electrical distribution box.

## Electrical Schematic

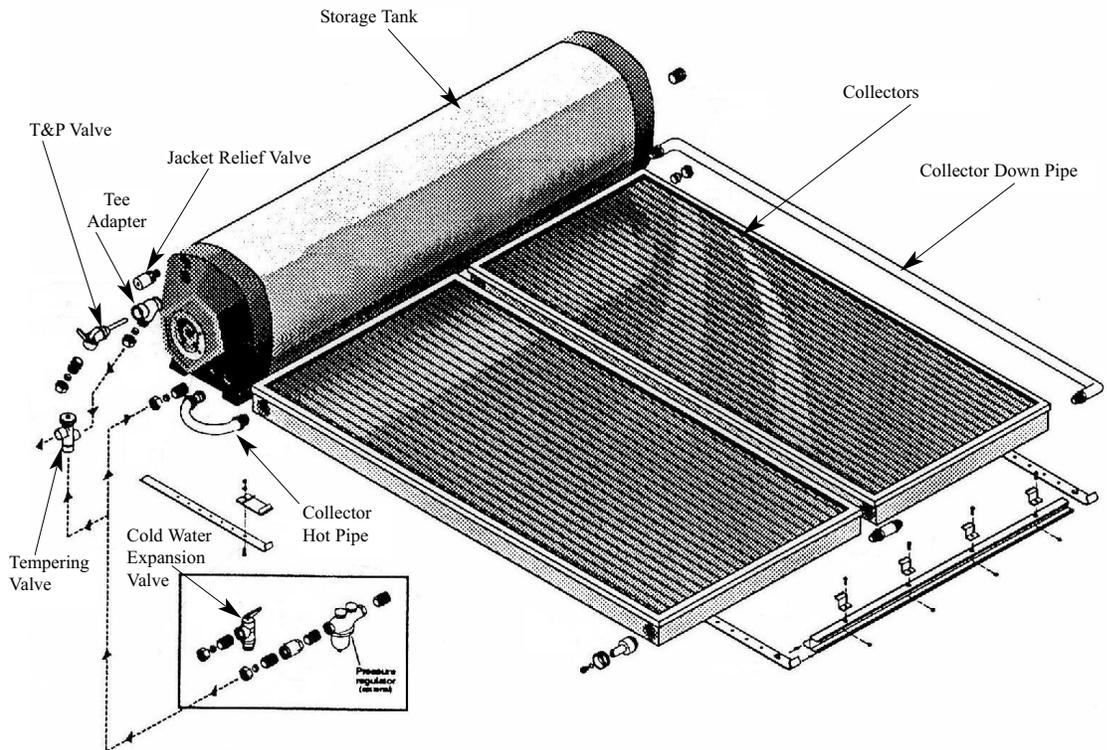


# Installing the water heater.

A new combination temperature and pressure relief valve, complying with the Standard for Relief Valves and Automatic Gas Shut-Off Devices for Hot Water Supply Systems, ANSI Z21.22, is supplied and must be installed in the opening provided and marked for the purpose on the water heater. No valve of any type should be installed between the relief valve and the tank. Local codes shall govern the installation of relief valves.

## Typical Installation

**▲WARNING:**  
Burns from Collector Fluid or Downpipe and Hot Pipe - Cover the solar collectors with an opaque (no light can penetrate) material and allow plumbing and fluid to cool before attempting any maintenance.



## Type of Installation

**▲WARNING:** Heat trace will not protect against pipe freezing in the event of power loss.

**NOTICE:** The closed loop piping between the storage tank and solar collectors does not require insulation and is rated up to 30°F.

Choose the installation type from the following;

1. As a replacement for an existing water heater (Preferred).
2. As the stand alone source of hot water for new construction or locations without a previous water heater.
3. As a pre-heater to an existing water heater.

**NOTICE:** Using the system as a pre heater to an electric water heater is less efficient than a stand alone

**system. (Not Recommended). Do not perform this installation unless specifically requested by the customer.**

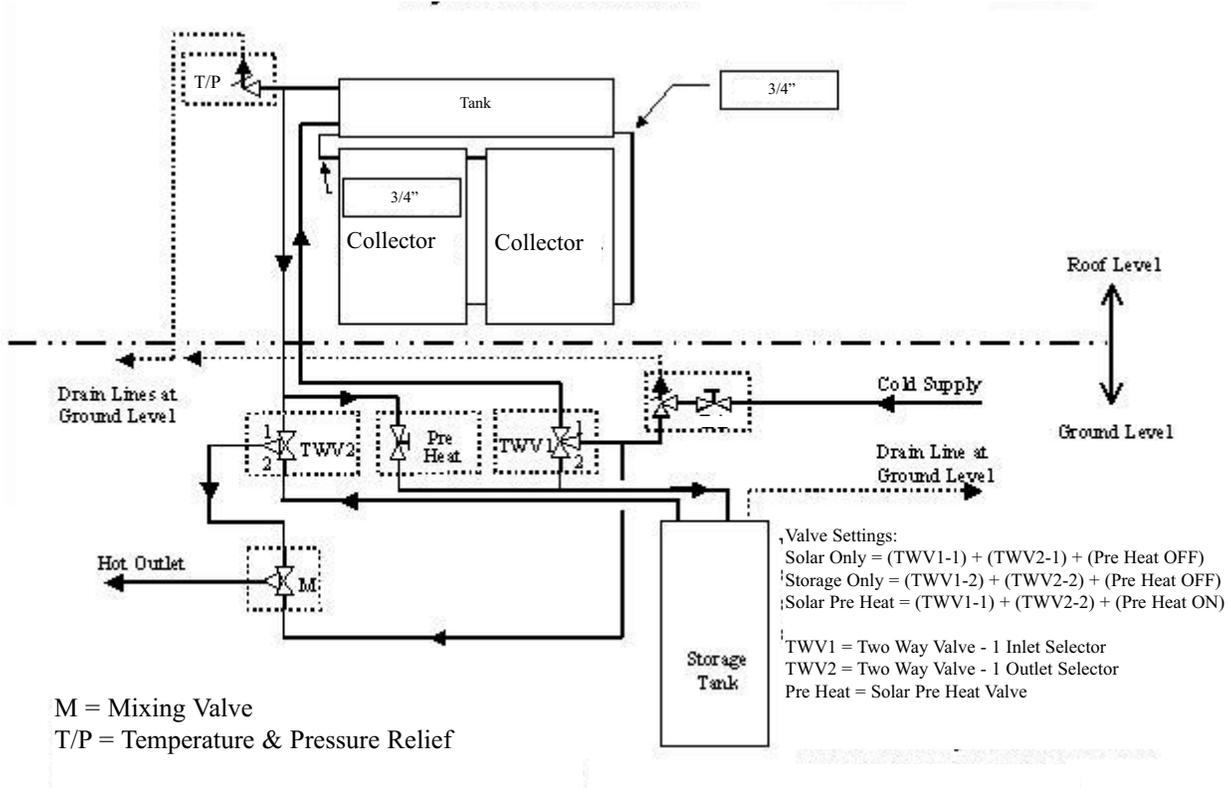
All plumbing installation must conform to local codes.

All piping must be adequately supported; supports must conform to local codes.

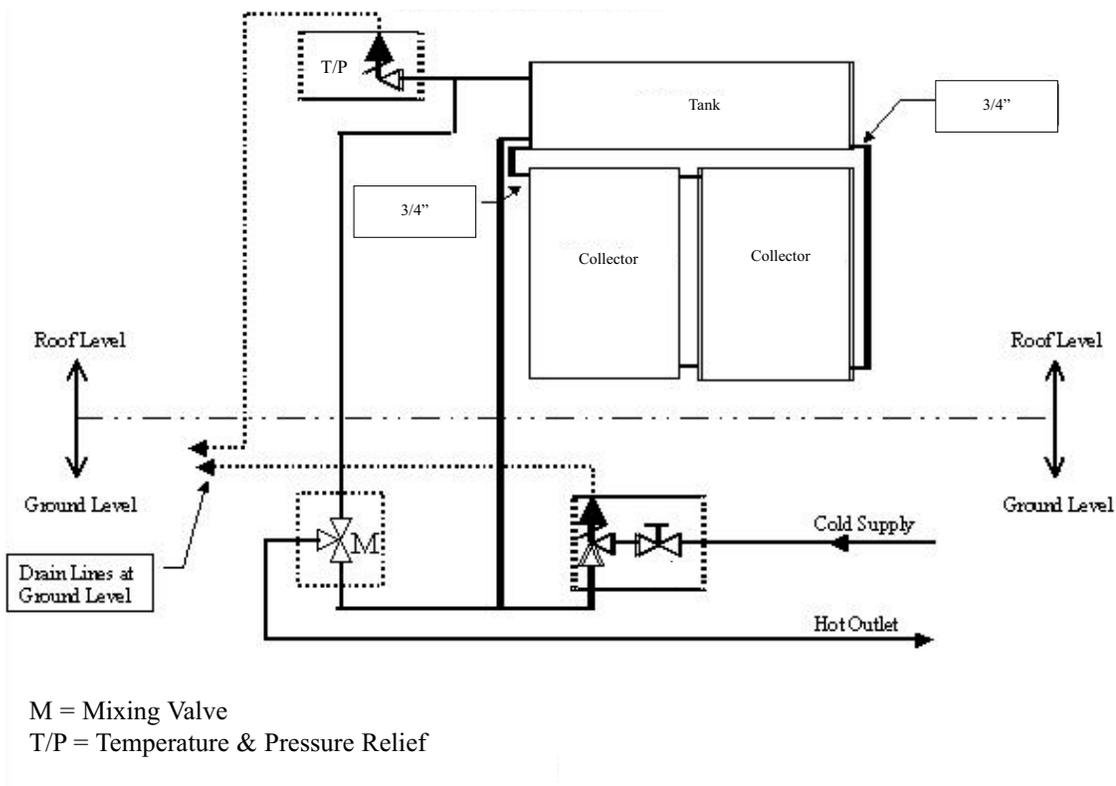
All piping must be sloped to a drain.

Plumbing must be installed so that the performance of any fire rated assembly is not reduced.

## Plumbing System Schematic for Replacement of Existing Electric Water Heater

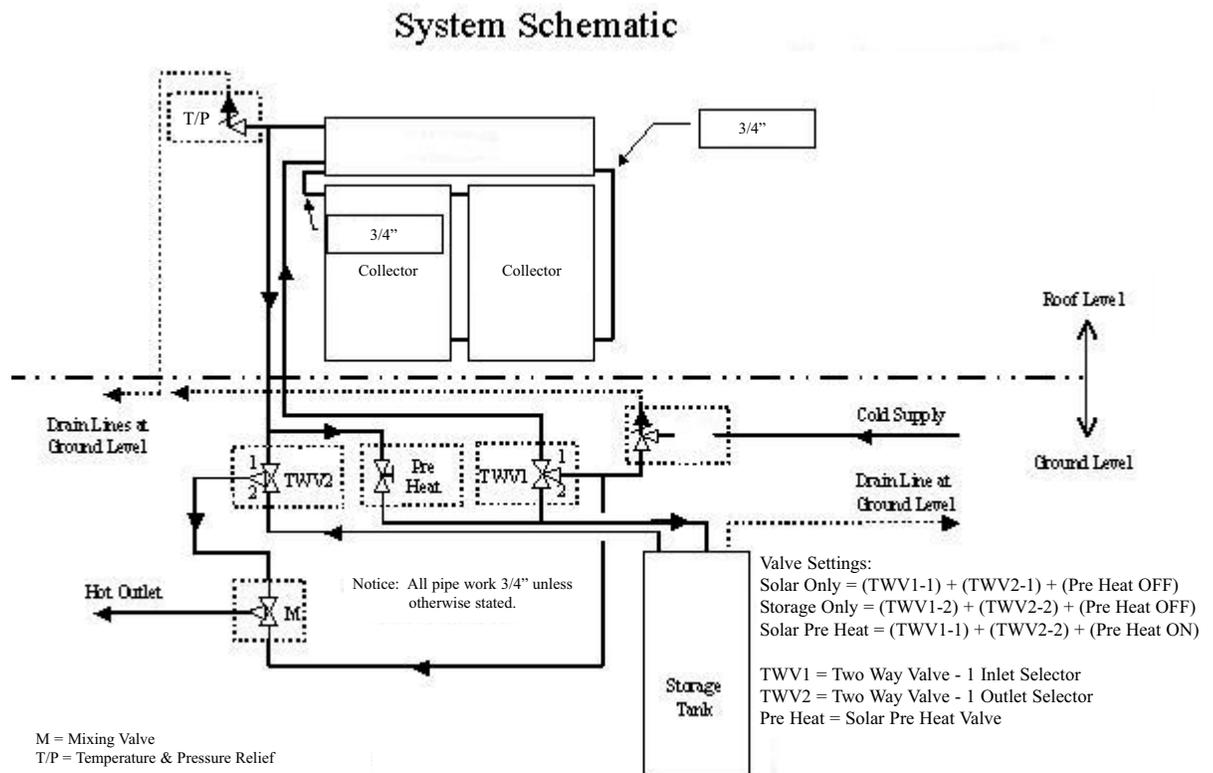


## Plumbing System Schematic for Installation of stand alone Water Heater



# Installing the water heater.

## Plumbing System Schematic for Installation as Pre Heater



## Types of Roof Installation

This section contains instructions for correct installation of the system. Complete the procedures in the order listed.

**NOTICE:** Installation of roof supports, plumbing, and electrical components must conform to local codes.

Installation types are divided into the following:

### Standard Installation:

The system is mounted to wood or Unistrut runners directly to the roof with no need for pitch or directional changes.

### Metal / Sturdy Tile Installation:

The system is mounted directly to the roof with no need for pitch or directional changes.

### Frame Installation (Side, Reverse, Shallow-Pitch and Flat-Roof Installation)

The system is mounted on a variable pitch frame to provide pitch or a fixed pitch frame to provide directional changes.

## Roof Preparation

This section contains instructions for correct installation of the system. Complete the procedures in the order listed.

**NOTICE:** The storage tank will be parallel to rafters of trusses for side-pitch mount and at a right angle for all other mounts.

Refer to the checklist for necessary roof modifications on page 12.

Install supports for Fragile Tile Roof

The system may be installed directly on most roof types if the roof is in good condition with adequate drainage.

For other types of roofs, do the following:

Clear area of roofing material from top of roof to lower edge of roof with 2'

clearance on each side (refer to Figure below) set aside for reinstallation.

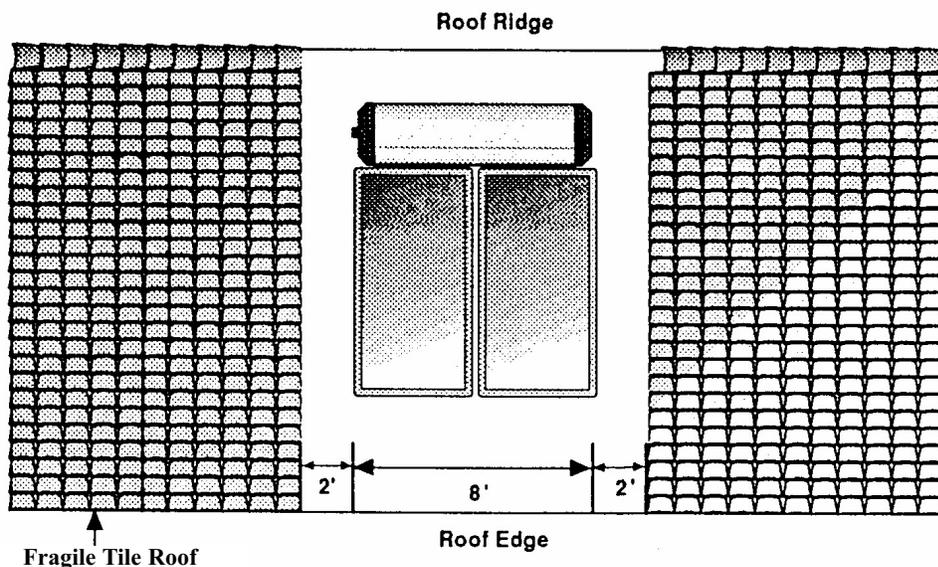
Install waterproof material over cleared area.

Fully seal and waterproof new material.

Continue with section; Supporting Structure Installation.

**NOTICE:** Supporting rafters may be either 16" or 24" on center. Runners will not be equally spaced on 16" on-center rafters. See Figure for "Wood Runner Detail".

**NOTICE:** Double check the placement of the runners over the rafters or trusses before drilling holes.



## Supporting Structure installation

Refer to the appropriate section listed below for installation procedures:

- Standard Installation: Page 19
- Metal / Sturdy Tile Installation: Page 20
- Frame Installation: Page 21

### Standard Installation

1. Mark supporting rafter/truss and bearing-wall locations on roof.
2. Place four 2" x 4" x 8' 4" redwood, treated-wood or Unistrut runners parallel down roof slope over marked rafters or trusses.
3. Drill each runner in center and 6" from

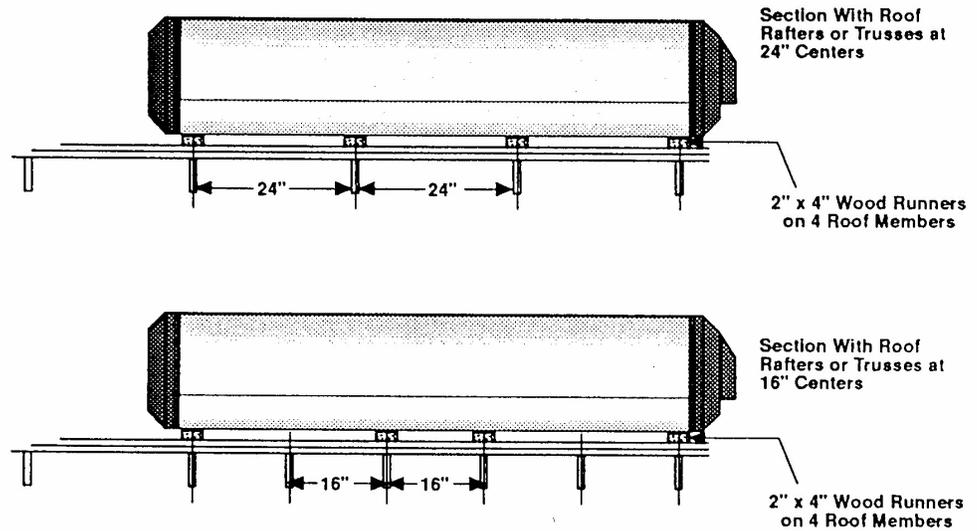
runner ends and attach to rafters or trusses with 5/6" x 6" lag screws and washers.

4. Flash and seal all roof penetrations.
5. Position Collector Extrusion so that flat vertical edge is toward roof ridge
6. Level the Extrusion using a spirit level and shims. After leveling, raise the hot pipe side of the extrusion by 1/2" per collector to ensure correct operation of the system (eg. For a 2 collector system, raise the hot pipe side of the extrusion by 1").
7. Mount the Extrusion to each runner using 5/16" x 2" lag screws or Unistrut bolts.
8. Continue with Collector Installation, page 23.

**NOTICE:** You may want to pre-drill runners with pilot holes to avoid splitting runners with lag screws.

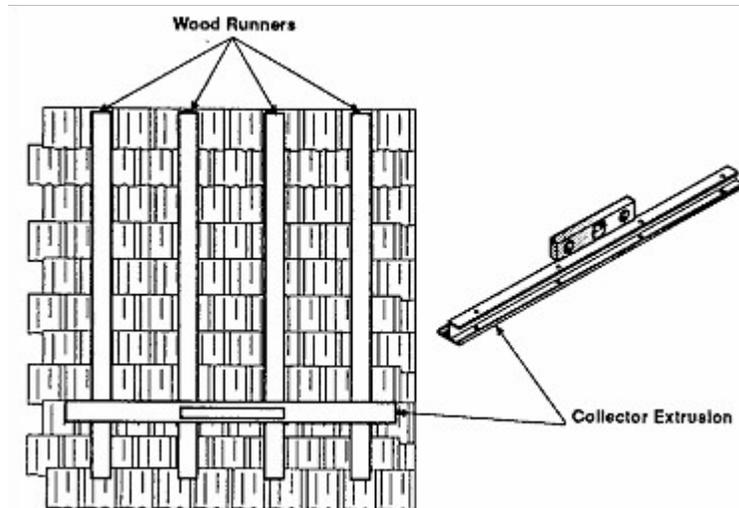
# Installing the water heater.

## Wood Runner Detail for 16" & 24" On-Center Rafters for Standard Installation



## Collector Extrusion Detail for Standard Installation

**▲ CAUTION:** The Extrusion must slope 1/2" per collector from horizontal (hot pipe side to be higher) for the system to work correctly.



## Metal or Tile Installation

**NOTICE:** Be sure the flat side of the vertical support of the extrusion faces toward the collector location and the "U" shape opens toward the lower roof edge.

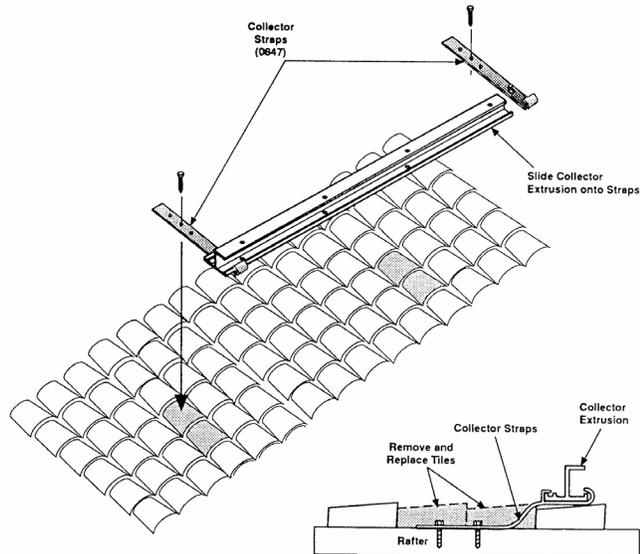
1. Mark tank location on roof with front foot of tank located directly over reinforced roof area.
2. Measure 82 inches down roof from front foot of tank to determine location for Collector Extrusion.
3. For Tiled roofs, remove tiles to allow for room to screw collector straps to rafters or trusses. If installing three collectors, remove tiles for third collector strap.
4. Slide the Collector Extrusion on to the Collector Straps. After leveling, raise the hot pipe side of the extrusion by 1/2" per collector to ensure correct operation of the system (eg. For a 2 collector system, raise the hot pipe side of the extrusion by 1").
5. Attach straps onto rafters or trusses with 5/16" x 6" lag screws.
6. Attach straps onto rafters or trusses with 5/16" x 6" lag screws.
7. Replace tiles that have previously been removed.
8. Flash and seal all roof penetrations.
9. Continue with Collector Installation.

---

## Collector Extrusion & Strap Installation Detail - Tile Roof

**▲ CAUTION:** Straps must be attached directly onto the rafters or trusses not less than 39" apart and not more than 63" apart.

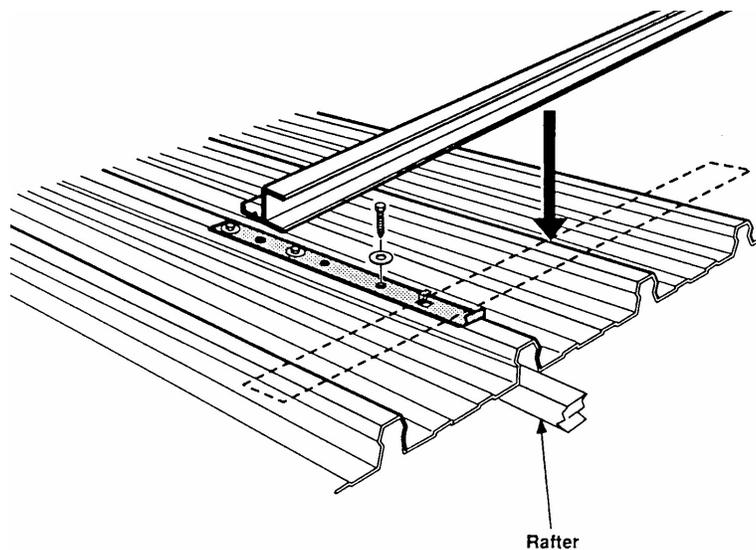
**▲ CAUTION:** The Extrusion must slope 1/2" per collector from horizontal (hot pipe side to be higher) for the system to work correctly.



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## Collector Extrusion and Strap Installation Detail - Metal Roof

**▲ CAUTION:** Ensure the weatherproof seal is restored.



---

## Frame Installation

**▲ CAUTION:** For all frame installations, the tank-end support points must be located over the load-bearing wall or a reinforced roof area.

**▲ CAUTION:** Ensure the weatherproof seal is restored.

The frame is attached to two wood or Unistrut runners and installed over rafters or trusses, bearing wall or reinforced roof area. Fixed pitch frame assemblies are used in reverse and side pitch installations, whereas variable pitch frame assemblies are used for shallow pitch or flat roof installations.

1. Remove roofing if necessary where runners will be installed to provide solid base for the frame.

2. Install two off 2" x 4" x 8'4" redwood, treated-wood or Unistrut runners;
- Mark supporting rafter or truss locations,
  - Place tank-end of runners over load-bearing wall,
  - Cut runners to straddle the two closest rafters diagonally,
  - Angle runners under support points to permit rainwater drainage.

# Installing the water heater.

## Frame Installation continued....

**NOTICE:** Allow room for "U" bracket pipe leg cradle on frame. Roofs with steep pitches (above 20°) may require short pipe legs at collector end of frame for clearance.

- Drill each runner in center and 6" from runner ends and screw to rafters or trusses with 5/16" x 6" lag screws and washers,
  - Flash and seal all roof penetrations.
3. Move all pieces of Frame to roof and assemble (refer to Figure below).
  4. Attach Frame to runners:

For shallow-pitch or flat roofs, screw frame directly to runners.

For side pitch or reverse pitch roofs;

- Loosely screw collector end of frame to runners with 5/16" x 1 3/4" lag screws and washers,
- Level frame and measure the required length for the tank-end pipe legs ( 5),
- Measure and cut un-drilled end of pipe

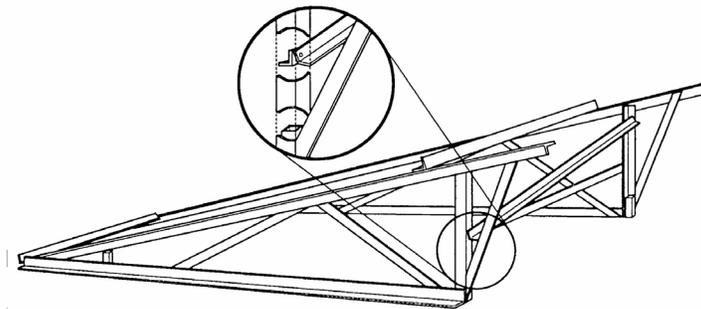
legs to correct length,

- Attach 'U' brackets to runners with 5/16" X 1 3/4" lag screws and washers or Unistrut bolts (refer to Figure below),

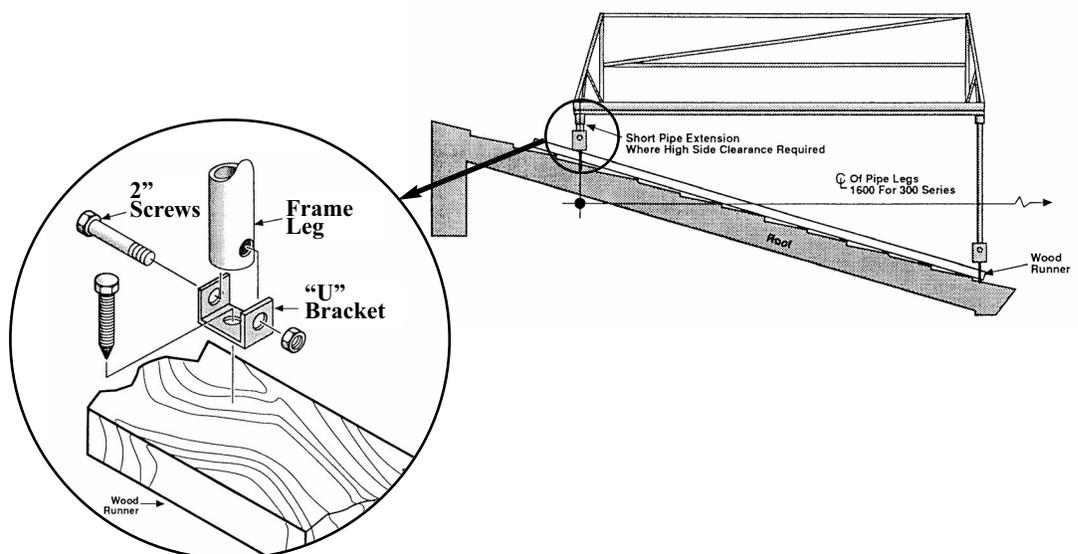
### Lower Pipe Leg Installation

- Insert un-drilled ends of pipe legs into frame,
- Attach drilled end of pipe legs to 'U' brackets using 2" screws,
- Screw pipe legs to frame with 2" screws through pipe legs and frame sleeves,
- Continue with Collector Installation.

### Frame Assembly



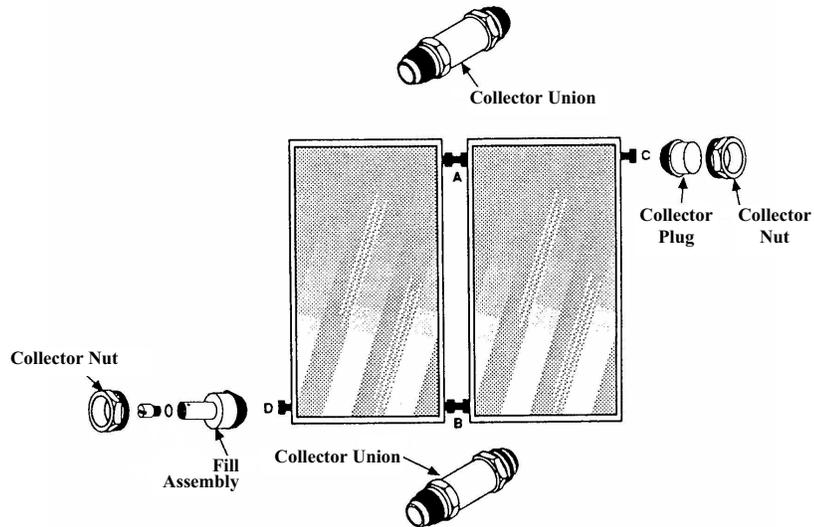
### Pipe Leg Connection Detail



# Collector Installation

## Collector Fitting Installation Detail

**CAUTION:** The Extrusion must slope 1/2" per collector from horizontal (hot pipe side to be higher) for the system to work correctly.



**CAUTION:** Do not damage Internal Collector Absorber with screws.

1. Set collectors in place, resting lower ends on collector extrusion or frame,
2. Remove plugs from corners of the collectors
3. Connect collectors with collector unions. Do not tighten fully (refer to points A & B in the figure above).
4. Check that collectors slope 1/2" per collector from horizontal (hot pipe side to be higher).
6. Install the collector plug and the collector nut at Point C.
7. Install collector fill assembly and collector nut at Point D.
8. Attach collectors to support

structure as shown below.

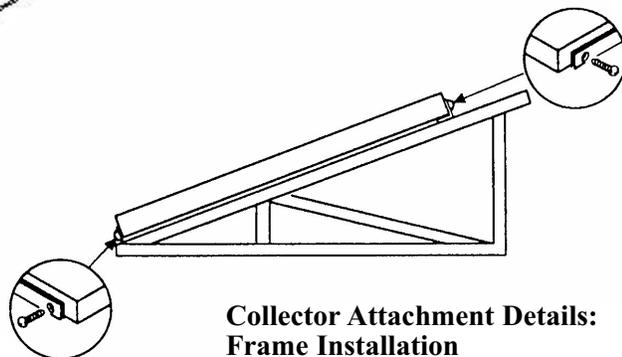
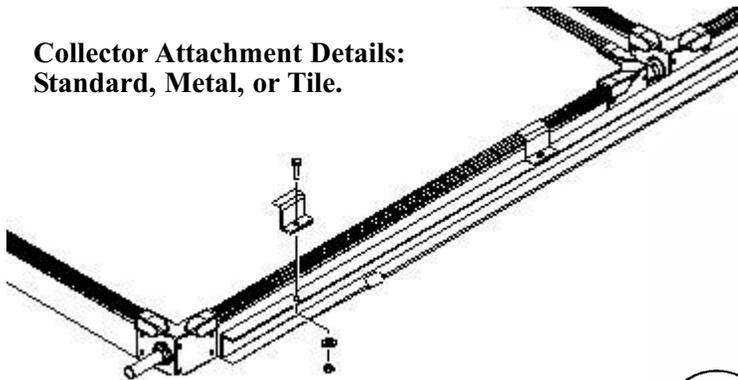
### Standard Installation

Attach collectors to extrusion using 2 sets of collector clamps, screws and nuts, per collector .

### Frame Installation

1. Attach collectors with 2 sheet metal screws per collector, through the angle iron upright into the collector frame at the top and bottom of each collector.
2. Tighten collector unions, parts and hardware securely.
3. Continue with storage tank installation.

Collector Attachment Details:  
Standard, Metal, or Tile.



Collector Attachment Details:  
Frame Installation

# Installing the water heater.

## Storage Tank Installation

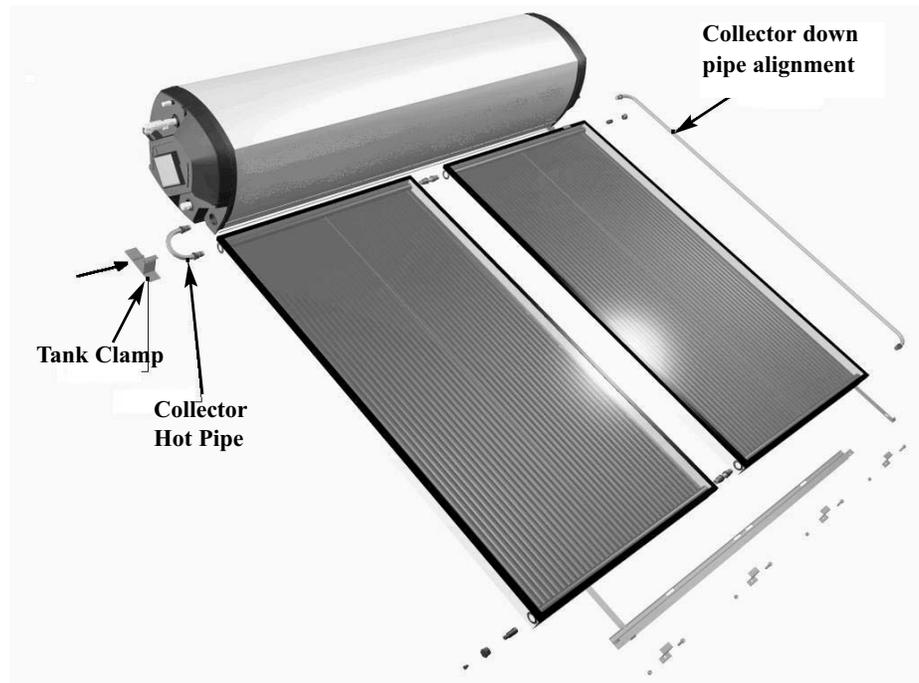
**▲ CAUTION:**  
Do not damage internal collector absorber with screws.

**▲ CAUTION:**  
DO NOT install on a roof with a pitch beyond 45°.

**▲ CAUTION:**  
If lifting tank to roof manually, use correct lifting techniques.

**NOTICE:** A crane may be necessary for installation.

**▲ CAUTION:**  
If pitch is 30°-45°, additional tank bracing is required.



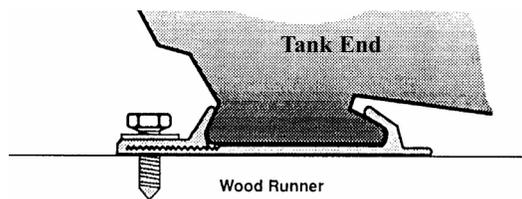
1. Spread open (4) four tank clamps (2 for metal or sturdy tile installations) to allow room to clear tank foot, and attach to rear foot of tank.
2. Place the (2) two tank-to-collector spacers at the top of the collectors, to ensure correct spacing for alignment of downpipe and hot pipe. Refer to figure above.

directly into rafters or trusses not less than 39" apart and not more than 63" apart.



Storage Tank Attachment Detail to Metal/Tile

**▲ CAUTION:** Do not tighten tank in place at this stage.



Storage Tank Attachment Detail to Wood Runner

2. Attach two tank straps directly to rafters or trusses with 5/16" x 1 1/4" lag screws.
3. Screw tank clamps to each strap with 5/16" X 1 1/2" machine screws and washers.

### Frame Installation

1. Screw tank clamps directly to frame with 5/16" X 1 1/2" machine screws and washers.
2. Carefully align collector hot pipe and downpipe connections with tank.
3. Connect hot pipe to lower-left side of tank (or pipe extension) and upper-left side of left-hand collector. Do not fully tighten.
4. Connect downpipe to lower-right side of tank (or pipe extension) and lower-right side of right-hand collector. Do not fully tighten.
5. Tighten hot pipe and downpipe connections side of right-hand collector. Do not fully tighten.

3. Attach tank to supporting structure as detailed in sections above.

### Standard Installation

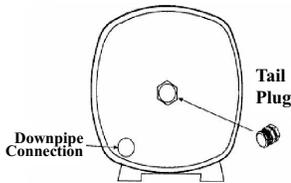
Drill holes in each runner, and screw clamps directly to runner with 5/16" X 1-1/4" lag screws, see figure above.

### Metal / Sturdy-Tile

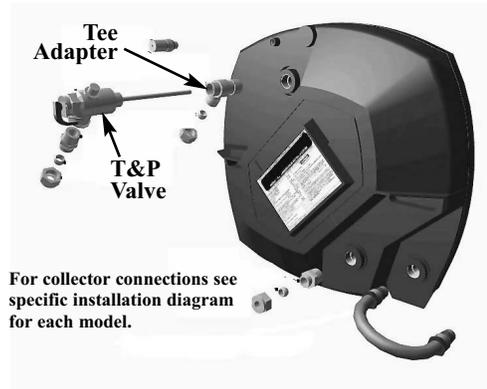
1. For a sturdy tile roof, remove the tiles to allow room to screw tank straps directly into the rafters or trusses.

**▲ CAUTION:** Tank straps must be screwed

**⚠ CAUTION:** If using teflon tape to seal T&P valve, make sure the tape does not block the water passage.



6. Level the tank.
7. Tighten the tank system in place.
8. Tighten hot pipe and downpipe connections.
9. Install tee adapter (See figure at right).
10. Install T/P Valve into tee adaptor (See figure at right).
11. Install tail plug in right end of tank (See figure at left).
11. Continue with plumbing installation as described in section below.



**Storage Tank Plumbing Attachment Detail, Left Side**

## Plumbing Installation

**⚠ CAUTION:** Plumbing must be installed so that the performance of any fire rated assembly is not reduced.

**NOTICE:** The location of the roof jack may vary depending on installation type.

**NOTICE:** The closed loop piping between the storage tank and solar collectors does not require insulation.

**⚠ WARNING:** Heat trace will not protect against pipe freezing in the event of power loss.

1. Review checklist sketches for roof-jack location.
2. Mark on the roof the exact location of roof-jack installation.
3. Install plumbing according to type of installation on page 17 & 18 and plumb lines to roof according to Key to Stub-Outs.

### External Piping Insulation

- Where potable water piping is in an external location or attic space where the temperature can be as low as 19°F it must be insulated with a minimum ¾" Armaflex (or similar) flexible elastomeric closed cell thermal insulation. Where the temperature can fall to 12°F the insulation thickness must be increased to 1 ½".
- It is recommended that electrical heat tracing be installed on potable water piping in areas where the temperature falls below 32°F for more than 4 hours with no hot water draw to protect against pipe freezing.
- Insulation in external locations can deteriorate through UV radiation. To prevent this, a layer of outdoor UV stable paint or other similar protective coating must be applied to the insulation.

The following may be performed in any order necessary:

- If water pressure exceeds 60 psi,

install optional Pressure Regulator on main supply to building.

- Connect the outlet of the T/P and pressure relief valve to a suitable open drain so that the discharge water cannot contact live electrical parts and to eliminate potential water damage.

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

- Piping used should be of a type approved for hot water distribution.
- The discharge line must not be smaller than the outlet of the valve and must pitch downward from the valve to allow complete drainage (by gravity) of the relief valve and discharge line.
- The end of the discharge line should not be threaded or concealed, and should be protected from freezing.
- No valve of any type, restriction or reducer coupling should be installed in the discharge line.

**NOTICE:**

1. All plumbing installation must conform to local codes.
2. All piping must be adequately supported, supports must conform to local codes.
3. All piping must be adequately insulated, insulation must conform to local codes.
4. All piping must slope to drain.

# Installing the water heater.

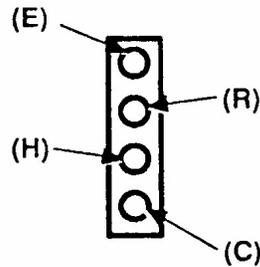
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**NOTICE:** This section does not apply if this system is installed as a pre-heater to an existing water heater.

**▲ CAUTION:** Do not connect the electricity to the main circuit breaker until the tank is full of water.

**NOTICE:** Ensure the plumbing is installed to allow for the removal of the storage tank end cover for the maintenance procedures.

See Key to Stub - Out Details Below:



All plumbing and wiring Stub-Outs to be a minimum of 18" above roof frame.

(E) Electrical service (240V, 20-amp required only if using auxiliary electrical backup in tank)

(R) 3/4" Relief Line

(H) Hot Supply to House

(C) 3/4" Cold Supply to Rheem thermosiphon tank

• **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.

• Install hot and a cold water shut-off valves next to the existing water heater in a convenient location.

## Electrical Installation

1. See "Connect the Storage Tank to the Electrical Supply Section" on page 29 for electrical requirements.
2. Install according to Figures on page 15, electrical schematic, and optional electrical connections.

## Install Roof - Jack Panel

1. Remove the necessary roofing material,
2. Place the panel over the plumbing and electrical stub-outs and install it with nails or screws,
3. Flash and seal all roof penetrations.
4. Replace the roofing material.

## Connect the Plumbing to the Storage Tank, (see the Figure at the top of page 25.)

1. Connect the cold water supply line to the storage tank.
2. Connect the solar hot water line to the Tee Adapter.
3. Connect the drain line to T/P Valve.

---

## To Fill the Water Heater

**▲ CAUTION:** On new construction, Do Not fill storage tank and/or charge the closed loop system until the water heater is ready for use. Cover the collectors until the system is filled and charged. Place a tag on the system if it is not filled and charged.

Make certain the drain valve is completely closed.

Open the shut-off valve in the cold water supply line.

Open each hot water faucet slowly to allow the air to vent from the water heater and piping.

As the water heater fills, air will be pushed from the open outlet faucet. A steady flow of water from the hot water

faucet(s) indicates a full water heater.

Check the tank and cold water lines for leaks and repair any found.

Ensure that the storage tank is completely free of air by opening the T/P Valve until it discharges a steady stream of water. Then close the valve.

The system is now ready to Test and Fill the closed loop as described in the next section of this manual.

## Test and Fill the Closed Loop

**⚠ WARNING:** Under no circumstances can any fluid other than Hartgard be used, alternate fluids could be hazardous to your health.

**Closed Loop Fluid** The closed loop must be filled ONLY with Hartgard solution and potable water.

Each system closed loop is to be filled with one bottle of Hartgard and the balance potable water.

When mixed, the approximate Hartgard concentration is 20%.

### Material Safety Data

Service Temperature Range  
-40°F to 300°F

Freezing Point -50°F

Boiling Point 212°F

Flash Point 218°F

Auto Ignition Temperature  
> 750°F

Fluid Color **Light Blue**

### First Aid

- Eye Contact: Irrigate with water for 5 minutes
- Skin Contact: Wash with flowing water or shower
- Inhalation: No adverse effects
- Ingestion: No adverse effects
- Advice to Doctor: Treatment based on judgement of doctor in response to patient reaction

### Disposal of Fluid

Reprocess or burn in an approved incinerator in accordance with Federal/State/Local code requirements.

## Test and Fill Procedure

**⚠ CAUTION:** On new construction, Do Not fill storage tank and/or charge the closed loop system until the water heater is ready for use. Cover the collectors until the system is filled and charged. Place a tag on the system if it's not filled and charged.

- Remove the Fill Plug from the collector fill assembly.

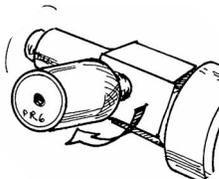
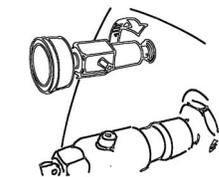
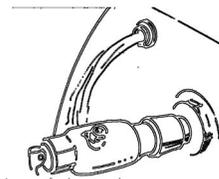
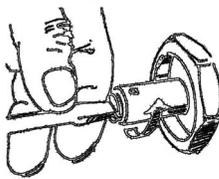
- Remove PR6 Jacket Relief Valve from the tank.

- Connect a 1/2" hose and fill the closed loop with water.

- Continue filling until the water overflows from the PR6 Jacket Relief Valve port and air bubbles stop.

- Fit the Test Block into the PR6 Port.

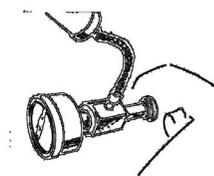
- Fit the PR6 Jacket Relief Valve onto the Test Block.



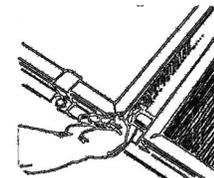
- Now remove the hose from the Fill Assembly and replace the Fill Plug.



- Connect a bicycle pump to the Test Block and pressurize the Closed Loop to 11.6 psi.



- Check all connections for any evidence of leakage.

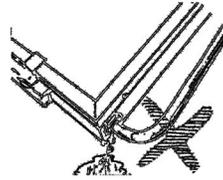


- Ensure that the pressure remains constant at 11.6 psi for at least 10 minutes.

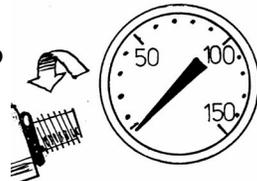


# Installing the water heater.

- Rectify leakage if observed at any of the connections and repeat steps indicated on previous page.

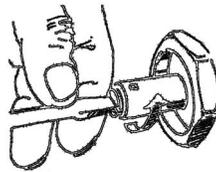


- Release the pressure from the closed loop by loosening the PR6 valve from the Test Block.

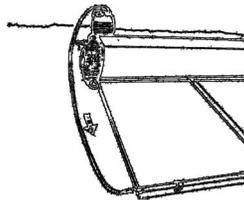


- When the pressure is zero, tighten the PR6 Jacket Relief Valve.

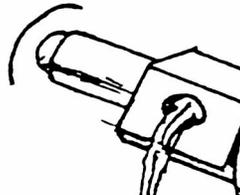
- Once again remove the Fill Plug from the Fill Assembly and connect the hose.



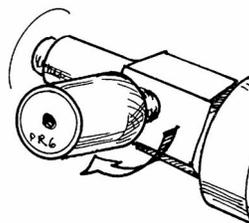
- Remove the PR6 Jacket Relief Valve and siphon the entire contents of the blue Hartgard container with help of the hose.



- Water will flow through the PR6 port on the Test Block during this operation.



- When the Hartgard container is completely empty, refit the PR6 valve onto the Test Block.

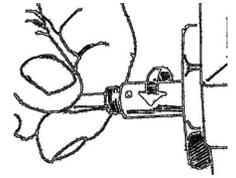


- Remove the hose from the Fill Assembly.

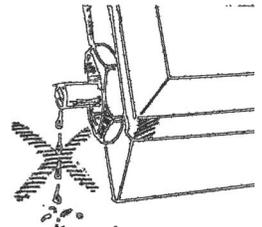
- Allow the fluid to flow until it stops.

- (This checks the vacuum seal on the PR6 valve).

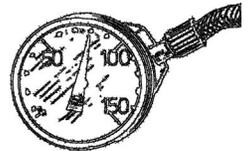
- Once the flow stops, screw in the Fill Plug.



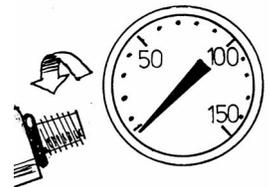
- Pressurize the Closed Loop to 11.6 psi as before with the help of the bicycle pump and ensure there is no leak at the Fill Assembly.



- Ensure that the pressure remains at 11.6 psi for at least 10 minutes, as before.



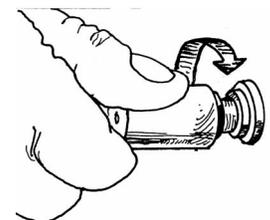
- Release the pressure from the closed loop by removing the PR6 Valve from the Test Block.



- Remove the Test Block from the Tank.



- Fit the PR6 Valve in its place on the tank after ensuring that the "O" ring is in its seat.



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## Connect Storage Tank to Electrical Supply

**⚠ CAUTION:**  
To reduce the risk of electric shock or fire follow local codes.

**⚠ CAUTION:**  
Ensure the water heater tank is full of water before the main is turned on.

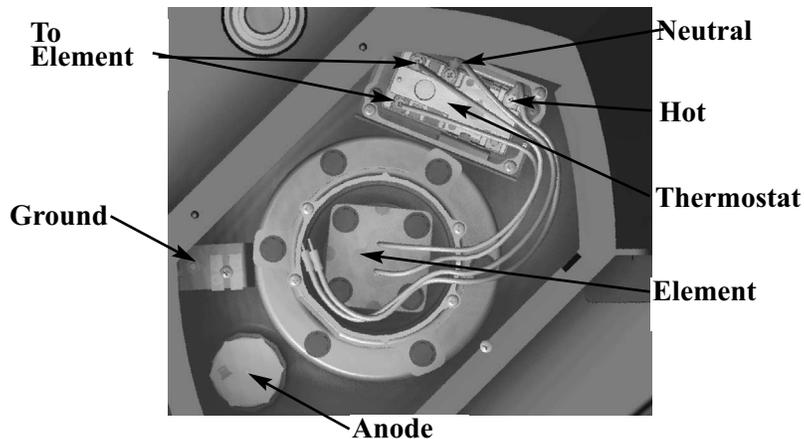
- Use only a utility supply having a maximum of 240 volt, 1 phase, 60Hz, power supply.

**⚠ WARNING:** Turn off all power to avoid injury.

- The water heater must always be connected to the ground in accordance with the local codes.
- Connect the branch circuit equipment grounding means and system grounding conductors to the water heater at the terminal marked "G".
- Use only copper conductors.

1. Turn OFF the main site electrical power.
2. Remove left tank End Cover, thermostat and element covers, to expose electrical connections.
3. Connect the hot and neutral electrical connections into the terminal block.
4. Connect the electrical ground wire to the ground screw
5. Replace tank end cover.
6. Turn ON main circuit breaker.

### Detail of Electrical Connections



### Complete System Installation

1. Insulate all plumbing lines. See page 16 for details
2. Replace tiles or other roofing to cover straps, etc, as necessary.
3. Remove and dispose of packing materials and leave area clean and neat.
4. Instruct homeowner regarding system operation and features.
5. Complete Post-Installation Checklist.

# Operating the water heater. Installation Checklist

---

**⚠ CAUTION:** Hydrogen gas can be produced in a hot water system served by this water heater that has not been used for a long period of time (generally two weeks or more). **HYDROGEN GAS IS EXTREMELY FLAMMABLE!!** To dissipate such gas and to reduce risk of injury, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will be an unusual sound such as air escaping through the pipe as the water begins to flow. Do not smoke or use an open flame near the faucet at the time it is open.

## Safety Precautions

- A** Do not turn off power to water heater if it has been subjected to over heating, fire, flood, physical damage.
- B** Do Not turn on water heater unless it is filled with water.
- C** Do Not turn on water heater if cold water supply shut-off valve is closed.
- D** If there is any difficulty in understanding or following the Operating Instructions or the Care and Cleaning section, it is recommended that a qualified person or serviceman perform the work.

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## Safety Controls

**⚠ WARNING:** If the water heater has been subjected to flood, fire, or physical damage, turn off power and water to the water heater.

Do not operate the water heater again until it has been thoroughly checked by qualified service personnel.

The water heater is equipped with a combination thermostat and temperature limiting control (ECO) that is located above the heating element in contact with the tank surface. If for any reason the water temperature becomes excessively high, the temperature limiting control (ECO) breaks the power circuit to the heating element. Once the (ECO) breaks, it must be replaced.

**⚠ CAUTION:** The cause of the high temperature condition must be investigated by qualified service technician and corrective action must be taken before placing the water heater in service again.

### To replace the temperature limiting control:

- 1** Turn off the power to the water heater.
- 2** Remove the jacket access panel(s).
- 3** Remove the old thermostat and replace it with a new one.

**⚠ DANGER:** There is a hot water scald potential if the thermostat is set too high. Households with small children, disabled, or elderly persons may require a 120°F or lower thermostat setting to prevent contact with HOT water.

## Water Temperature Setting

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.

Safety and energy conservation are factors to be considered when selecting the water temperature setting of the water heater's thermostat. The lower the temperature setting, the greater the savings in energy and operating costs.

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

Water temperatures above 125°F can cause severe burns or death from scalding. Be sure to read and follow

the warnings outlined in this manual and on the label on the water heater. This label is located on the water heater near the thermostat access panel.

Mixing valves for reducing point of use water temperature by mixing hot and cold water in branch water lines are available. Contact a licensed plumber or the local plumbing authority for further information.

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

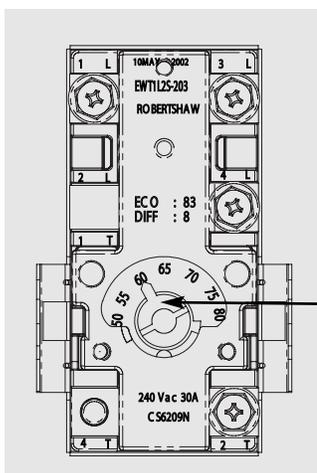
## Time/Temperature Relationship in Scalds

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

## If adjustment is necessary...

- 1 Turn off the power to the water heater.
- 2 Remove the jacket access panel.
- 3 Using a small screwdriver, set the thermostat dial pointer to the desired temperature.
- 4 Replace the jacket access panel. Turn on the power to the water heater.



Thermostat  
Dial Pointer

# Care and cleaning of the water heater.

---

## Draining the Water Heater

**▲CAUTION:** Before draining the thermosiphon tank, the pressure on the closed loop must be relieved or the loop may collapse.

**▲CAUTION:** Shut off power to the water heater before draining water.

**▲DANGER:** Before manually operating the relief valve, make certain no one will be exposed to the hot water released by the valve. The water drained from the tank may be hot enough to present a scald hazard and should be directed to a suitable drain to prevent injury or damage.

In order to drain the water heater, turn off the cold water supply. Open a hot water faucet or lift the handle on the relief valve to admit air to the tank.

Attach a garden hose to the drain valve on the water heater and direct the stream of water to a drain. Open the valve.

---

## Routine Preventative Maintenance

**▲DANGER:** Before manually operating the relief valve, make certain no one will be exposed to the danger of coming in contact with the hot water released by the valve. The water may be hot enough to create a scald hazard. The water should be released into a suitable drain to prevent injury or property damage.

**▲CAUTION:** The collectors must be cool before washing.

**NOTICE:** If the temperature and pressure relief valve on the hot water heater discharges periodically, this may be due to thermal expansion in a closed water system. Contact the water supplier or your plumbing contractor on how to correct this. Do not plug the relief valve outlet.

Properly maintained, your solar water heater system will provide years of dependable trouble-free service.

It is suggested that a routine preventive maintenance program be established and followed by the user.

It is further recommended that a periodic inspection of the operating controls, heating element and wiring should be made by service personnel qualified in appliance repair.

At least Quarterly:

1. Clean collector glass periodically to remove accumulated dust and dirt.
2. Trim trees near collectors.

At least annually:

1. Lift and release the lever handle on the temperature and pressure relief

valve, located on the left side of the thermosiphon tank, to make certain the valve operates freely. Allow several gallons to flush through the discharge line. Make certain the discharged water is directed to an open drain.

At least every three to five years:

1. Check all valves and electrical equipment.
2. The anode rod should be removed from the water heater's tank for inspection and replaced when more than 6" of core wire is exposed at either end of the rod. See section below for additional information

Flush the tank with cold water until the pressure is relieved, some of the water is drained, and the cold water supply is turned off before removing anode rod.

3. Check fluid level in closed loop. Replace fluid if necessary.

---

**NOTICE:** Do not remove the anode rod from the water heater's tank, except for inspection and/or replacement, as operation with the anode rod removed will greatly shorten the life of the glass lined tank and will exclude warranty coverage.

## Anode Rod

This water heater is equipped with an anode rod designed to prolong the life of the glass lined tank. The anode rod is slowly consumed, thereby eliminating or minimizing corrosion of the glass lined tank.

Water sometimes contains a high sulfate and/or mineral content and together with cathodic protection process can produce a hydrogen sulfide, or rotten egg odor in the heated water. Chlorination of the water supply should minimize the problem.

# Care and cleaning of the water heater.

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**NOTICE: Refer to the Hydrogen Gas Caution in the Operating Instructions.**

**▲DANGER: Use extreme care to avoid falling while on a ladder or the roof. If a roof section does not appear to be solid under foot, do not subject it to any added weight until it is adequately reinforced.**

## Vacation and Extended Shut-Down

Once your system has been installed and tested by the technician, it operates automatically and requires little attention. However, there are several precautions you should be aware of to ensure your complete satisfaction with the system, and some steps you must take if you are going to be away from home for a long time, and when the seasons change.

### Vacations or Brief Absences

If you are going to be away from home for an extended period, two weeks or more - you may consider deactivating the system so that it does not continue to heat the water tank while hot water is not being used in the house.

**Deactivating or reactivating this system requires you to access the system on your roof.**

### Deactivating the System

If you choose not to perform the procedures listed below, call your authorized service technician to deactivate or reactivate your system.

Deactivating the system is easy to complete in a few steps.

1. Turn OFF the power to the system at the or at the main solar breaker switch near the main power breaker box.
2. Cover the collectors with cardboard or other sturdy light-blocking material. Tie or tape the material securely so it will not blow off.

When you return, simply reverse the procedures to reactivate the system.

1. Uncover the collectors carefully to avoid scratching the surfaces.
2. Turn ON the power to the system or at the main solar breaker switch near the main power breaker box.

**NOTICE: If this system is your only source of hot water, be sure you turn on the power to the backup at the circuit breaker.**

**This system requires about four (4) hours to heat a tank of cold water using the backup heater.**

**A warm tank will heat in less time.**

**As with any other hot water system, gas, electric or solar, you should not drink water directly from the faucet.**

### Severe Cold Weather, Snow or Extended Absences

If the collectors are likely to be covered with snow for an extended time, or if the system will not be used for one month or longer, the water heater and piping should be drained to prevent freezing or stagnant water. After a long shut-down period, the water heater's operation and controls should be checked by qualified service personnel. Make certain the water heater is completely filled again before placing it in operation. Call your local dealer and arrange for a qualified service technician to perform this operation.

# Before You Call For Service...



**Troubleshooting Tips**  
**Save time and money! Review the chart on this page first and you may not need to call for service.**

<b>Problem</b>	<b>Possible Causes</b>	<b>What To Do</b>
<b>Not enough Hot Water</b>	Solar circuit breaker tripped or fuse blown	Reset/replace as necessary
	Safety Thermostat tripped or malfunctioned	Reset/replace as necessary.
	Faulty Backup Heating Element	Replace Backup Heating Element
	Hot water leak in household system	Locate and repair leak
	Blockage in water line	Locate and correct blockages
	Pipes not properly connected during installation	Correct pipe connections according to installation instructions
	Tank blocked with sediment	Flush tank to remove sediment
	Closed loop charge low	Recharge closed loop
	Leak in closed loop	Locate and repair as necessary, recharge closed loop
	Air bubbles in closed loop	Recharge closed loop
	Ruptured tank jacket	Replace tank
	Tank not level	Level tank
	Collectors not level	Level collectors
<b>Not enough Hot Water in the Morning or Following a Cloudy Day</b>	System circuit breaker tripped OFF or malfunctioned	Repair/replace as necessary
	Faulty Backup Heating Element	Replace as necessary.
<b>Too much Cold Water Coming from Drain Line</b>	No T/P Valve installed	Install T/P
	Too much pressure through T/P Valve	Repair/replace as necessary.
<b>Hot Water coming from drain Line</b>	Pressure build up caused by Thermal Expansion in a closed plumbing system.	Contact water supplier or contractor on how to correct this. (Do not plug relief valve opening.)
	Faulty Thermostat	Repair/ replace as necessary
	Malfunctioning T/P valve	Press and release T/P valve handle to reseal valve or Repair replace as necessary
	System oversized for customer	Cover the solar collector / contact Dealer.

**▲ CAUTION: For your safety DO NOT attempt repair of electrical wiring, thermostats, heating elements or other safety devices. Refer repairs to qualified service personnel.**



**Troubleshooting Tips**  
Save time and money! Review the chart on this page first and you may not need to call for service.

<b>Problem</b>	<b>Possible Causes</b>	<b>What To Do</b>
<b>No Hot Water</b>	Hot water tempering valve fouled	Repair/replace as necessary
	Pressure imbalance (over 5 psi) between hot and cold water lines	Locate and repair cause of imbalance.
	Fouled pressure regulator valve	Repair/replace as necessary
	Cold water line blocked	Repair as necessary.
<b>Low Hot Water Pressure</b>	Fouled pressure limiting Valve Strainer	Repair/replace as necessary
<b>Water too Hot</b>	Tempering valve malfunction	Repair/replace as necessary.
	System oversized for customer requirements	Cover a solar collector/contact installer.
<b>Gas coming from Hot Water tap</b>	Result of system operating but water not being used	Run tap to allow gas to escape.
	Corroded Anode	Replace

**⚠CAUTION:** For your safety **DO NOT** attempt repair of electrical wiring, thermostats, heating elements or other safety devices. Refer repairs to qualified service personnel.

# Frames

## Installations using 17.5° “A” Frames

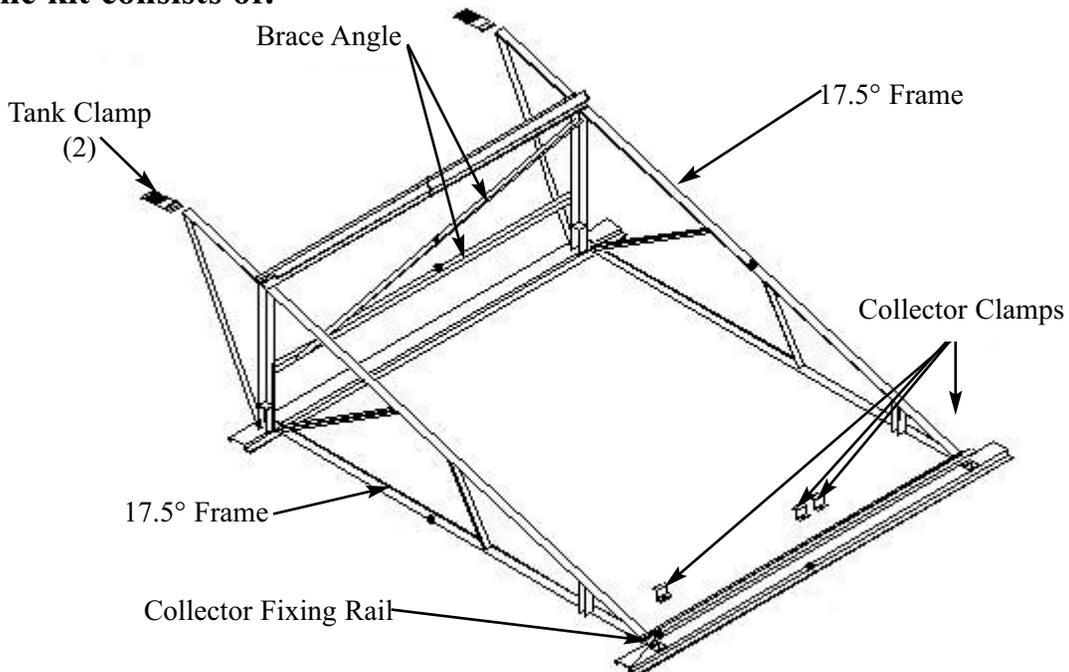
This ‘A’-Frame is not for use in areas susceptible to hurricanes. In areas susceptible to hurricanes or very high winds, a separate set of instructions and a hurricane frame mounting kit is required and available from Rheem. The hurricane frame mounting kit is suitable for with pitch and low pitch installations only.

The ‘A’ Frame kit is for use where side pitch, against pitch and low or flat

roof installations are required. The ‘A’ Frame kit is provided with 17.5° angled side frames. Fixing nails, bolts, screws and flashing material are not normally supplied by Rheem except by special arrangement. The weight of the assembled frame is approximately 110 lbs. The installations described below are for an 80 gallon, 2 collector system, however, the same procedure is applicable for all models.

Description	47 Gallon	80 Gallon
5/16" hex set screw	16	18
5/16" washer	6	6
5/16" nut	20	22
5/16" bolt (2" long)	4	4
Coach screws	2	2
Pipe leg	2	2
U' Bracket	2	2
Brace angle	2	2
Stainless steel straps	2	2
Tank clamp	2	2
17.5 Frame	2	2
Tank Collector Rail	1	1
Collector clamps	2	4
Collector Fixing Rail, Single Collector	1	0
Collector Fixing Rail, Two Collectors	0	1
Baseplate	2	2

### The ‘A’ Frame kit consists of:



# Frames continued.....

## Side Pitch Installations (Tile Roof)

Assemble the 'A' Frame kit and loosely bolt the baseplate to one side of the angle frame.

For installations on a roof with a pitch greater than 20°, a 'U' bracket and small pipe legs should be used on top of the baseplate as shown.

Note that the baseplate is positioned towards the rear of the frame to distribute the weight of the tank more evenly.

Remove several roofing tiles to expose the outer wall. Fix the 'U' brackets to the top of the wall plate and secure with the coach screws supplied.

Using the assembled stand in a level position, measure the required length for the pipe legs, allowing for the inside length of the pipe leg cradle.

Cut the two pipe legs the same length.

Fit the pipe legs to the 'U' bracket using the 5/16" x 2" bolts.

Insert the pipe legs to the assembled stand and fit the 5/16 x 2" bolts.

Remove tiles from above the baseplate to expose the rafters.

Fix the two stainless steel straps onto the baseplate and fix the straps to the rafter.

Replace the tiles to the lower portion of the roof, then weather seal and overflash the penetrations through the roof.

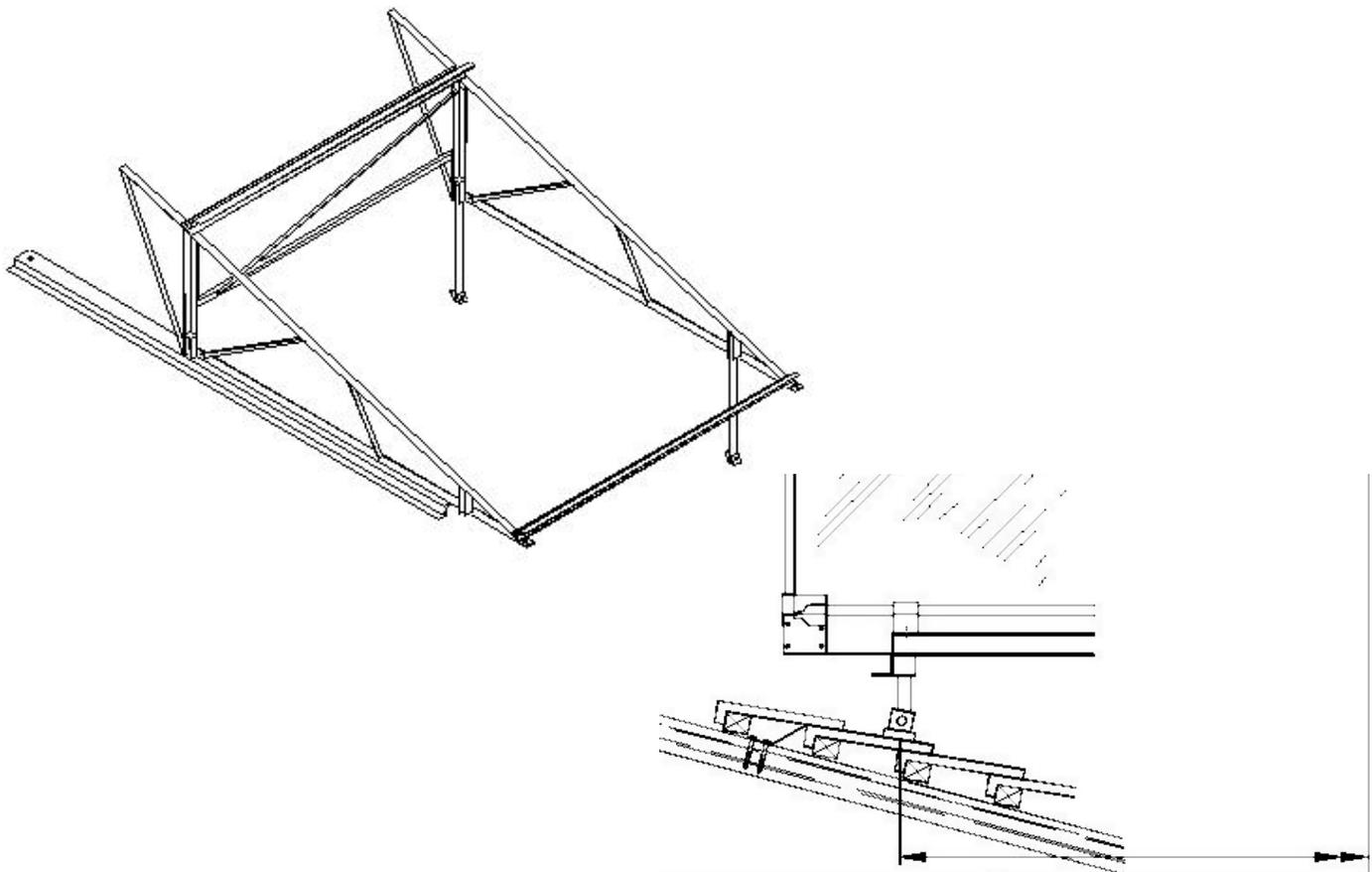
Position the collectors centrally on the frame.

Check that the collector is level across the frame using a level.

Secure the collector in place using the collector clamps.

Fit the tank and the fittings to the frame as per the standard installation instructions.

Fit the aluminum tank clamps onto both rear and front feet of the tank base.



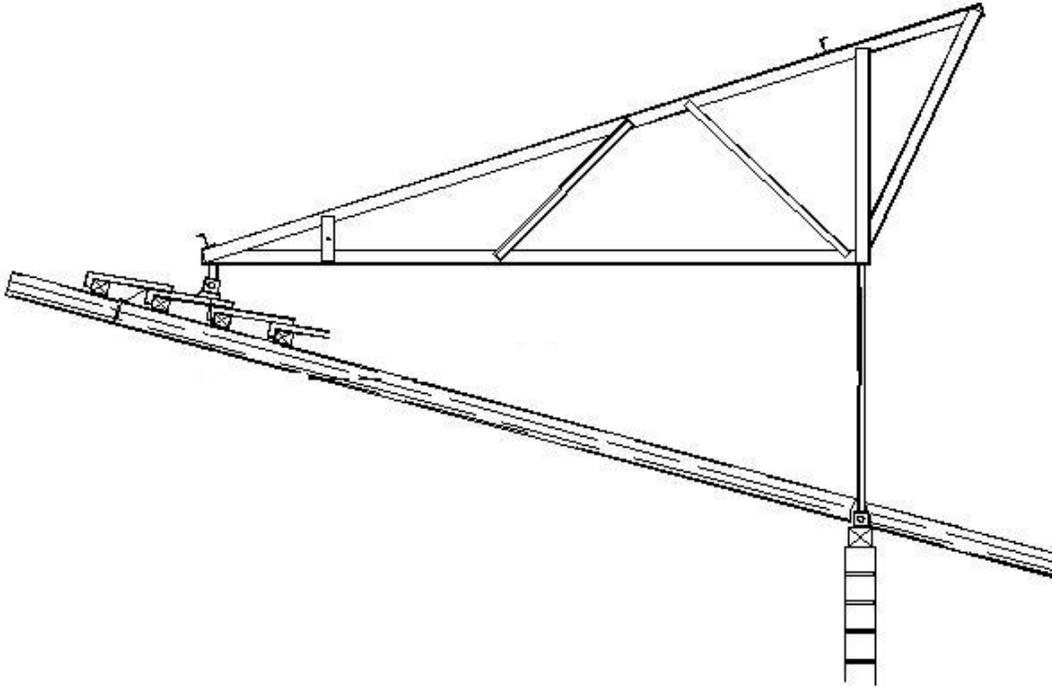
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## Against Pitch Installations (Tiled Roof)

Assemble the stand and then loosely bolt the baseplate to the frame in position.

For installations on a roof with a pitch greater than 20°, a 'U' bracket and small pipe legs should be used on top of the baseplate.

The frame installation proceeds following the instructions for side pitch installations, with the pipe legs located directly over a load-bearing wall.



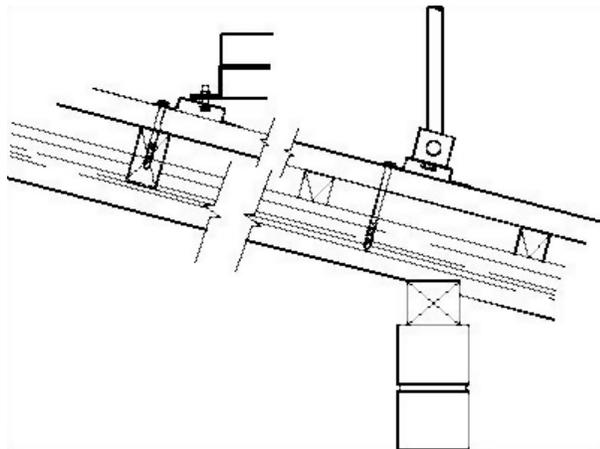
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## Variations for Metal and Fibreboard Roofs

Assemble the stand and then loosely bolt the baseplate to the frame in position.

For installations on a roof with a pitch greater than 20°, a 'U' bracket and small pipe legs should be used on top of the baseplate.

The frame installation proceeds following the instructions for side pitch installations, with the pipe legs located directly over a load-bearing wall.



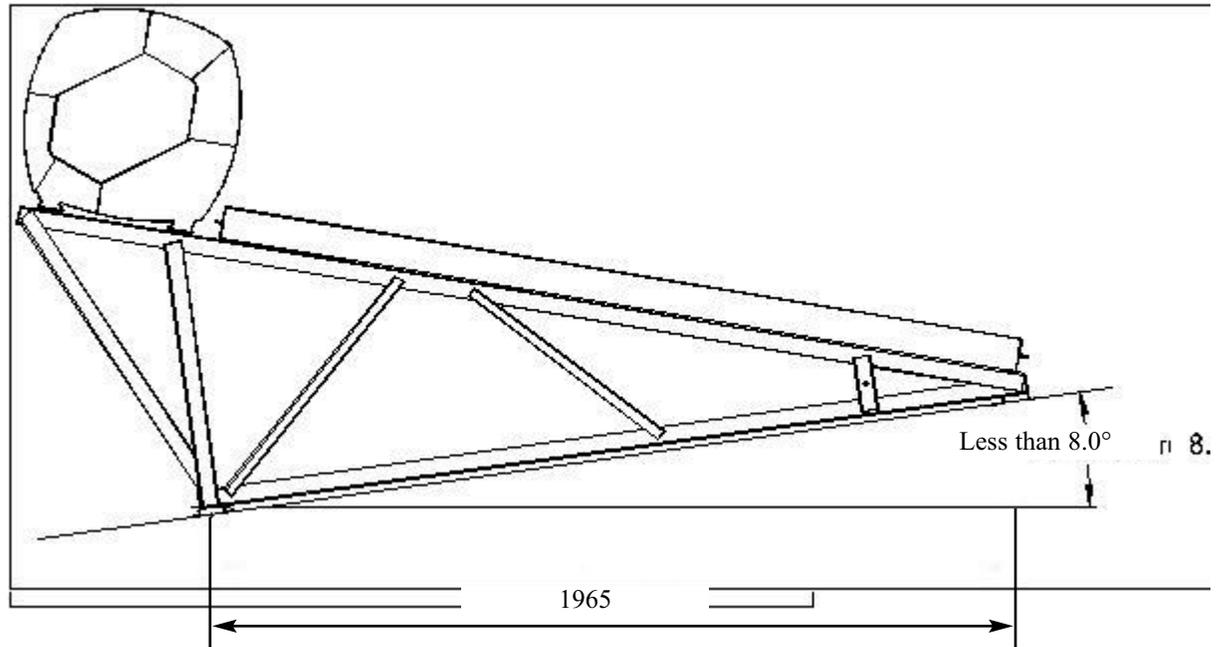
# Frames continued.....

## Variations for Shallow Pitch or Flat Deck Roofs

On shallow pitch roofs (less than 8°) of metal or fibreboard materials, the frame may be installed without using the pipe legs, provided that the inclination of the solar collector remains greater than 8°.

On flat roofs, the assembled frame may be installed without the baseplates.

Provided the roof material is structurally suited, the frame may be bolted directly to it.

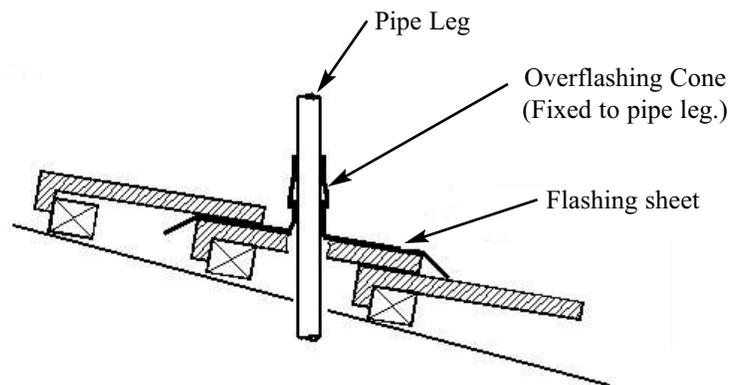


## Flashing and Roof Penetrations

Flashing of roof penetrations must meet the requirements of the local authorities. Suggested methods are shown below.

Alternative:

Clamp flashing cone in place with stainless steel hose clamp and seal to pipe leg with silicone mastic.



# IF YOU NEED SERVICE

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1. Should you have any questions about your new water heater, or if it requires adjustment, repair, or routine maintenance, it is suggested that you first contact your installer, plumbing contractor or previously agreed upon service agency. In the event the firm has moved, or is unavailable, refer to the telephone directory, commercial listings or local utility for qualified service assistance.

2. Should your problem not be solved to your complete satisfaction, you should then contact the Manufacturer's National Service Department at the following address:

2600 Gunter Park Drive  
Montgomery, Alabama 36109-1413  
Phone: 1-800-432-8373.

When contacting the manufacturer, the following information will be requested:

- a. Model and serial number of the water heater as shown on the rating plate attached to the jacket of the heater.
- b. Address where the water heater is located and physical location.
- c. Name and address of installer and any service agency who performed service on the water heater.
- d. Date of original installation and dates any service work was performed.
- e. Details of the problems as you can best describe them.
- f. List of people, with dates, who have been contacted regarding your problem.

If you need a manual in Spanish, please refer to our website: [www.rheem.com](http://www.rheem.com).

Si requiere de un manual de uso y cuidado en español, Usted puede obtenerlo en [www.rheem.com](http://www.rheem.com).