

SOLARHOT™

Drainback Solar Thermal System

Installation/ Owner's Manual



Description / Applications **System Overview**

The SOLARHOT™ solar thermal Drainback system can provide 70-90% of your domestic hot water needs annually. Water running through a solar collector is heated by the sun. The heat is then transferred to the potable water in your hot water tank. Water is circulated through each "loop" by high-efficiency circulation pumps through a brazed-plate heat exchanger. The collector loop contains distilled water and air so that when the pumps are not running, the water in the loop falls into the Drainback tank, leaving the collectors and the pipes that are exposed to freezing temperatures empty and safe from freeze damage.

A differential control runs the pumps and reads the temperatures at the collector and in the tank. It provides power to the pumps when the temperature in the collectors is 16° higher than the tank water temperature. The control includes a digital display with a touch pad to easily program temperature limits, differentials, vacation modes, and other advanced options.

SolVelox Drainback Systems:

S-SV-DB100	S-SV-DBHC87	S-SV-DBE78-120	S-SV-DBS40
S-SV-DBSEC40G	S-SV-DBHC58	S-SV-DBE64-120	S-SV-DBS32
S-SV-DBSEP40G	S-SV-DBSEC40	S-SV-DBE64	S-SV-DBE80-120
S-SV-DBE96G-120	S-SV-DBSEP40	S-SV-DBE52	S-SV-DBS64G
S-SV-DBE80G	S-SV-DBUMA64-120	S-SV-DBE40	S-SV-DBET60
S-SV-DBE64G	S-SV-DBUMA64	S-SV-DBE32	S-SV-DBET30
S-SV-DBE32G	S-SV-DBUMA40-120	S-SV-DBET60-120	S-SV-DBS64
S-SV-DBS80-120	S-SV-DBUMA40	S-SV-DBET30-120	S-SV-DBE96-120



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⚠ WARNING Electrical Shock, Fire, Explosion and Burn Hazards

This system must be installed, adjusted, and put into operation only by a trained, qualified professional or service agency in accordance with the National Electric Code ANSI/NFPA 70 (Canada CSA C22.1), state and local codes, and authorities having jurisdiction.

The installer must carefully read and follow the installation and service instructions contained in this manual. Make them available to the equipment owner, so they can be kept for future reference.

Features

SOLARHOT Drainback Advantage

SolarHot has uniquely created the SolVelox package, which pre-assembles and integrates an oversized stainless steel heat exchanger along with the pumps and valves necessary to drive a two-loop solar system. The heat exchanger and pumps are sized to meet the heat output of up to six solar collectors, so one SolVelox appliance provides an economical solution as you scale the system to meet your particular needs. Also, the SolVelox is externally mounted in order to reduce maintenance issues.

Safety

The best performance will come from a solar collector with aluminum sides and a low iron solar glass well sealed to hold the heat. These materials weigh 80-150 lbs., depending on the size of the collector.

⚠ WARNING Electrical Shock and Fall Injury Hazard.

Use extreme caution when mounting collectors on a roof or when connecting any wiring or electrical hookups.

- ALWAYS use fall protection
- Secure all ladders on level ground
- Locate all possible hazards, overhead wires, loose shingles etc
- Make sure power is turned off before adding water to the system
- NEVER connect power to the water heater or storage tank until it has been filled.
- Use a tempering valve or mixing valve to prevent scalding
- Consult proper authorities and check with your local building inspector for permit requirements and local building codes before project commencement. The system must meet local code requirements for penetrating structural members and fire-rated assemblies.

Certification

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

Materials List

DBS2P Drainback System

System requirements:

- SOLARHOT Equinox solar collectors with 1" gasketed unions or SOLARHOT Solstice collectors
- One (1) SOLARHOT SolVelox Drainback pump package (pumps, heat exchanger, solar differential control), including mounting bracket, six (6) screws, two (2) sensors (third sensor optional), and 50 ft. sensor wire
- One (1) 10 gal. Drainback tank with sight glass
- One (1) Flush mount hardware per collector
- One (1) solar dip tube
- One (1) ASSE 1017 certified mixing / tempering valve
- One (1) roof kit per collector array (flashing, caps, plug, reducing elbows)
 - One (1) 3/4" copper roof flashing with special adapter cap
 - One (1) 3/4" copper roof flashing with gooseneck
 - One (1) row Kit (for Equinox collectors, Solstice collectors add two (2) gasketed unions per collector or copper couplings and caps.
 - Two (2) 1"x3/4" elbows or 1 elbow + 1 thermal well

DBS2P3RM Drainback System with Adjustable Mount Hardware

System requirements:

- SOLARHOT Equinox solar collectors with 1" gasketed unions or SOLARHOT Solstice collectors
- One (1) SOLARHOT SolVelox Drainback pump package (pumps, heat exchanger, solar differential control), including mounting bracket, six (6) screws, two (2) sensors (third sensor optional), and 50 ft. sensor wire
- One (1) 10 gal. Drainback tank with sight glass
- Adjustable mount hardware (telescoping legs to vary mounting angle)
- One (1) solar dip tube
- One (1) ASSE 1017 certified mixing / anti-scald valve
- One (1) roof kit per collector array (flashing, caps, plug, reducing elbows)
 - One (1) 3/4" copper roof flashing with special adapter cap
 - One (1) 3/4" copper roof flashing with gooseneck
 - One (1) Row Kit (for Equinox collectors, Solstice collectors add two (2) gasketed unions per collector or copper couplings and caps.
 - Two (2) 1"x3/4" elbows or 1 elbow + 1 thermal well

Additional Materials Required

- Electric water heater to use for solar storage tank, 80 gal. minimum
- 3/4" copper tubing
- Mounting hardware for each additional collector
- 1" wall elastomeric insulation (e.g. Nomaco K-Flex LS)
- PVC insulation jacketing (e.g. Speedline Smoke Free PVC)
- Vinyl tape
- Approximately 9 gallons of distilled water depending on piping runs
- Flow meter that allows backflow (optional, see Installing the Drainback Tank)
- Drip pan (optional, see Installing the Drainback Tank)

Drainback System Specifications

DBS2P and DBS2P3RM

Congratulations on the purchase of your SolarHot System! Correctly installed and maintained, your system should provide you with many years of uninterrupted solar heated water. The solar collectors are designed to last 25-35 years, electric water heaters 10-20 years, and pumps, controls, and valves 5-10 years. Local water quality and usage will greatly affect life expectancies.

Solar Collector: (Recommended)

SOLARHOT S-SC-126D Equinox flat-plate collectors por S-SC-126S Solstice flat plate collectors

Solar Storage Tank (80 gal. minimum), not included:

Whirlpool EE3Z80HD055V

American Premier E62-80H-045DV

Rheem 81VR80TC-1

Lochinvar FTA082K

Pumps:

Collector Loop Drainback: Wilo Star 32B Tank Loop: Wilo Star 8B

Controller:

Differential Control TR 0301U, includes two (the third sensor is optional) PT1000 sensors, with one prewired.

Heat Exchanger:

SOLARHOT P-HX-210512

System operating parameters:

Flow meter should read about 5 gpm on the collector loop and 3.5 on the tank loop

Sizing the Collectors

The maximum energy you can get out of the system is controlled by a number of factors and the square footage of collectors is one of them. The more square footage of collectors you have, the more potential you have for collecting solar energy. If you live in the southern half of the country, the rule of thumb says you need 40 sq. ft. of collector area for the first two people in the household and 8 sq. ft. of collector area for each person after the first two. If the home is in the northern U.S., you would want to install 40 sq. ft. of collector area for the first two people and 14 sq. ft. per person for each additional person.

This rule of thumb doesn't take into consideration the quality of the solar collector that you use. It is possible to have a solar collector that produces two-thirds of the energy because the absorber is painted black vs. using a selective coating or because it uses lower quality glass that doesn't allow as much light to pass through. The rule of thumb just mentioned is appropriate for high-quality solar collectors. A high-quality solar collector has either black chrome-plated absorber or some form of selective surface. Also, the glazing (glass) on the collector needs to be high-transmission tempered glass. Avoid plastic glazed collectors since the clarity of the plastic will degrade quickly and ruin the value of your investment.

For more precise calculations based on weather data and collector information there are software packages available such as RETScreen available on the internet. <http://www.retscreen.net>

Collector Orientation

The collectors should be mounted as close to due south as is reasonable, considering the roof line. However, if the collector is mounted within 45 degrees of south, any performance drop is insignificant. The aesthetics of flush mounting a collector on the roof will generally outweigh performance improvements less than 5%.

For best year round performance the collectors should ideally be inclined at the same angle as the latitude, i.e. if you are located in Raleigh, NC (latitude 36 degrees) you would ideally have the collectors inclined 36° from horizontal. Testing has shown that mounting a collector within $\pm 15^\circ$ of the site's latitude will not significantly degrade the collector's annual performance.

Pay close attention to the angle and direction of the roof line. If your roof line doesn't match the ideal criteria listed above, we recommend adding collector area as opposed to mounting the collector at a tilt. For example: If your roof faces the southeast, you may use three collectors instead of the two collectors which would be typical for a family of four.

Further, minimize the shade over the collectors. Collectors should receive 6-8 hours of direct sunlight each day for optimal performance.

In a Drainback system, collectors should also slope 1/4" per foot toward the inlet. See "**Mounting the Collectors**," on page 10.

Mounting Options

There are two basic methods for mounting collectors on the roof or ground, as outlined in **Figure 2**.

- 1. Flush Mount**– This is the most common method. If the existing roof line is not suitable for any reason, the adjustable mount may be employed.
- 2. Adjustable Mount**– This is sometimes required on a flat roof or in the case of a ground mount to optimize available solar energy.

Figure 2 - Mounting Options

Flush Mount:



Adjustable Mount:



⚠ WARNING Fall Injury Hazard.

Prepare the roof to work safely, employing roof scaffolding methods approved by OSHA.

Installing the Collectors

Unfortunately stud finders for rooftops can be hard to come by, but it is still important to mount the collectors into the rafters. Here are some ways to locate a rafter:

- From inside the attic, drill an angled hole, about 45 degrees, at the intersection of the roof deck and the rafters of choice. Each spot where the drill penetrates the exterior of the roof should be near the center of its respective rafter.
- 2. Inside the attic, measure the distance from an existing roof protrusion to the nearest rafter. Use that same measurement on the outside of the roof to drill into the chosen rafter.
- 3. Drill into the roof from the outside. Then, inside the attic, measure from that drilled hole to the nearest rafter. Use the same measurement on top of the roof.
- 4. Using a 3/16" x 12" long drill bit, drill from the inside of the attic through the rafter to the outside.

Figure 3 - Spacing



Installing the Mounting Brackets

1. Draw a 10-foot long horizontal line at least 18" below the peak of the roof.
2. 97½" below the first horizontal line draw another 10-foot line as shown in **Figure 3**.
3. Locate the center of a rafter and mark vertically along the rafter with a chalk line between the two horizontal lines.
4. Using the rafter spacing, make vertical marks over the center of the rafters, marking all the rafters that the collectors will span.
5. Using the mounting foot as a template, hold the mounting foot at the center of each intersection. Holding the mounting foot at the intersection of the chalk lines, mark the holes with a marker. Repeat this procedure until each of the mounting foot locations have been marked (four mounting feet for each collector).
6. With a 3/16" drill bit, drill a pilot hole at each of the marks you just made.
7. Place the mounting feet over the pilot holes and, using 3/8" X 2 1/2" stainless steel lag screws, flat washers, and lock washers, screw them into the rafters as seen in **Figure 4a or 4b**.

Figure 4a - Flush Mount Shown

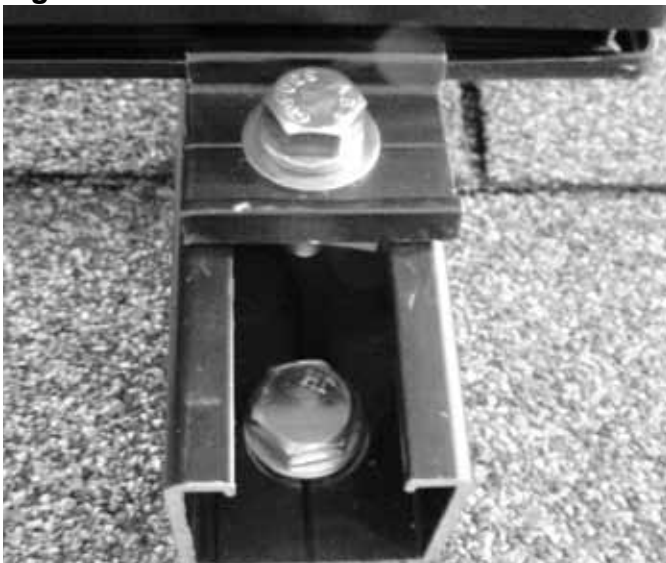


Figure 4b - Adjustable Mount Shown



⚠ WARNING Burn hazard.

When working with the solar collectors, cover the panels until installation is complete.

Both the panels and unions quickly begin to collect heat and pose a burn hazard.

Preparing the Collectors

The end of the collectors with the SOLARHOT name plate should be installed closest to the ridge of the roof, as there are weep holes to release condensation on the other end. The corners of the collectors will have 1" unions preinstalled. These will be mounted with elbows as seen in **Figure 5a**. Depending on system flow configuration, the two ends not in use will have end caps as in **Figure 5b**.

Figure 5a - Collector Configuration

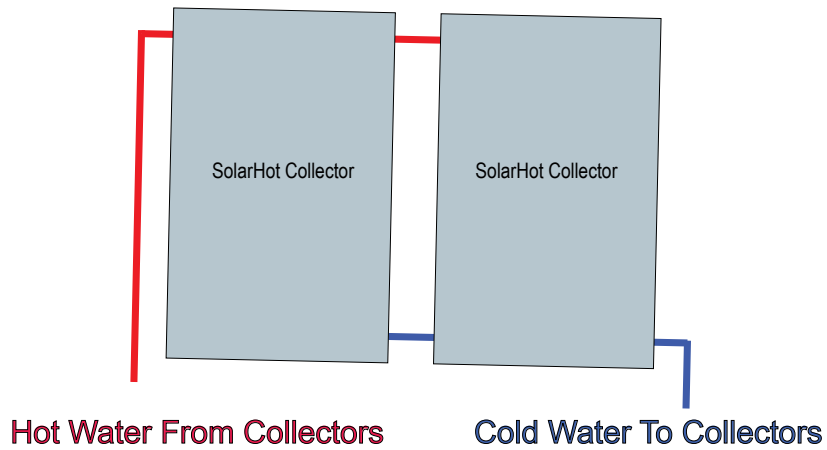


Figure 5b - Collector Configuration

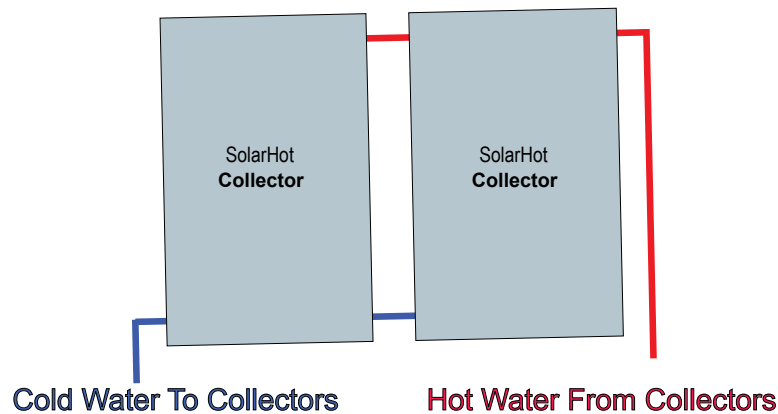


Figure 6 - Collector Flow

Collectors slope down 1/4" per foot toward cold water supply
Right to Left Flow



Collectors slope down 1/4" per foot toward cold water supply
Left to Right Flow



Mounting the Collectors

Mount the collectors so that there is a 1/4" drop per foot toward the inlet as in **Figure 6**. This facilitates proper system flow and drainage.

Refer to Figure 7a, 7b for proper installation.

1. The mounting clip is made up of two parts joined by a stainless steel bolt with a lock washer as in **Figure 8a and 8b**. Before taking the collectors up to the roof, slide the stainless steel sliding nut into the anodized

aluminum channel foot. Now carefully place the first collector so that the mounting clip fits in the mounting groove that runs around the bottom edge of the collector and tighten the bolt. Ensure that the clips are installed securely.

2. On the roof, mount the next collector so that the unions join to the first collector and secure the mounting clips as in **Figure 9**.

Figure 7a

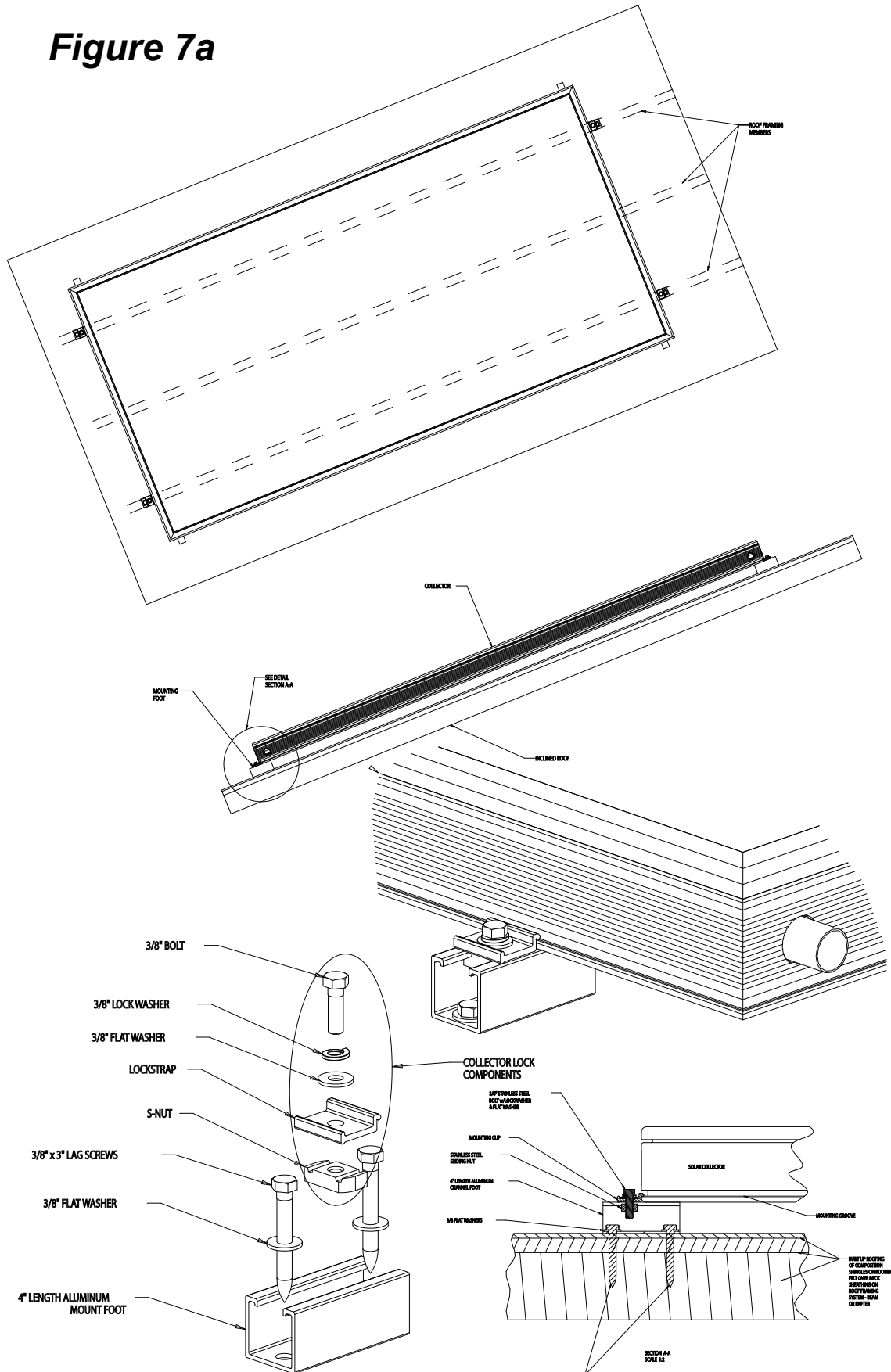


Figure 7b

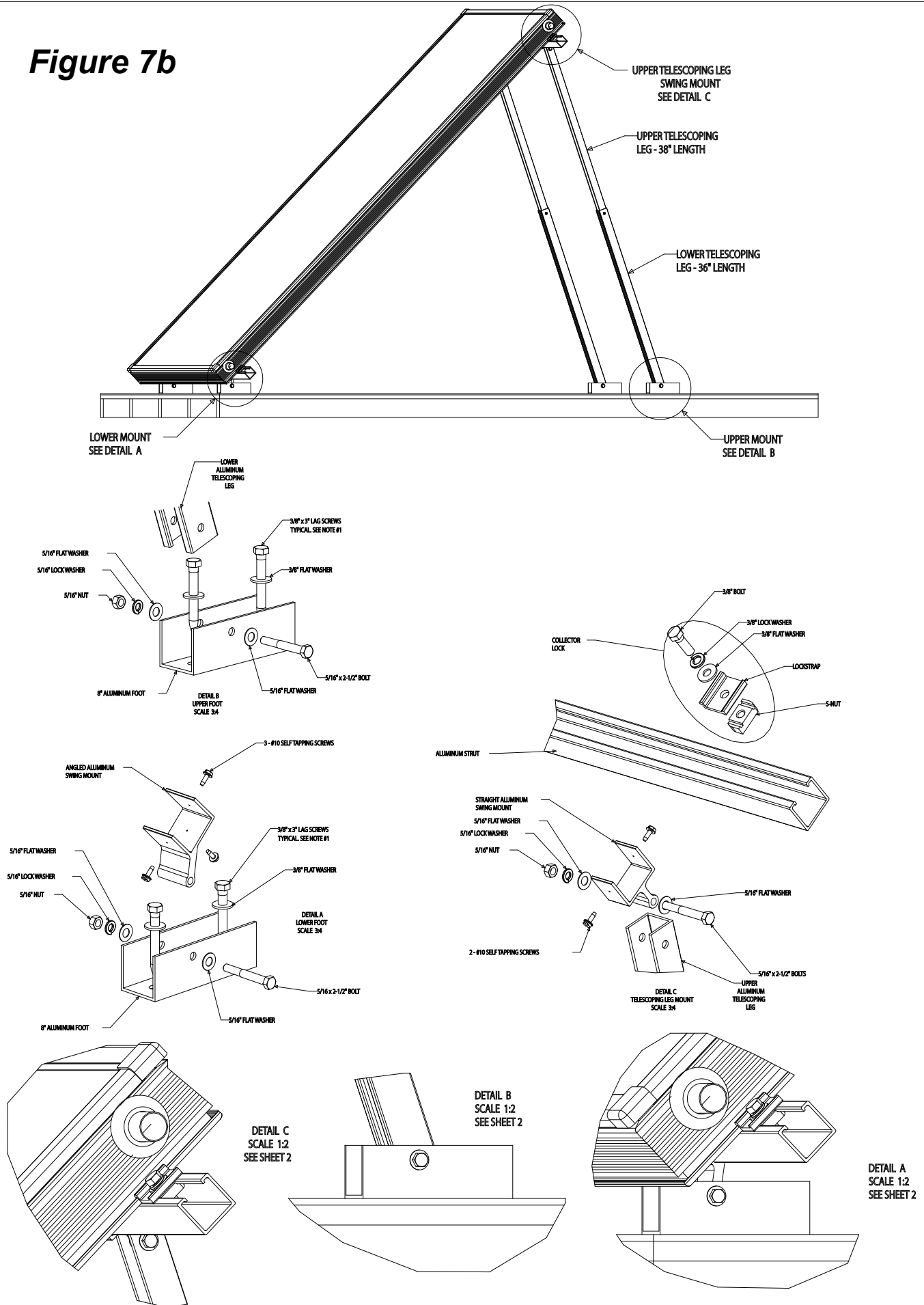
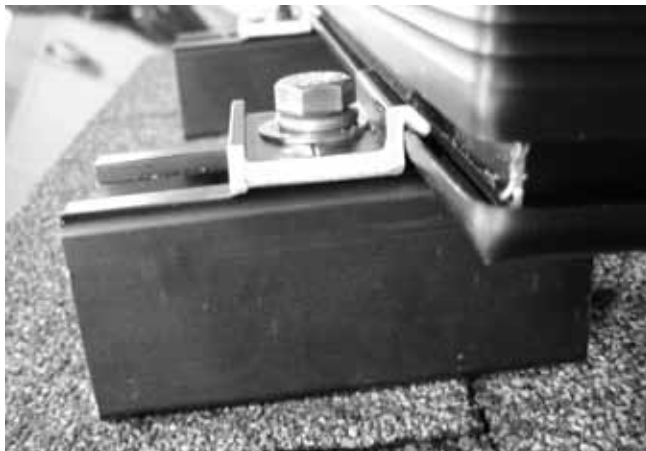


Figure 8a: Mounting Clips for Flush Mount**Connect to Pipes**

1. Using a wood bit the same size as your pipes, drill a hole in the center of a shingle below where the bottom corner of the

Figure 9: Joining Collectors**Figure 8b: Mounting Clips for Adjustable Mount**

collector inlet will be and in the opposite corner, where the collector outlet will be.

2. Apply sealant to the underside of the copper flashing. Carefully raise and place flashing underneath the drilled shingle, inserting the collar through the hole as shown in **Figure 10**.
3. Run pipes from attic through the copper flashing and sweat connect them to the street elbows. **See “Pipe Runs” section for specific instructions.**

⚠ WARNING

DO NOT USE PLASTIC PIPING. PEX, PVC and other forms of non-metal pipes will burst at solar temperatures. Only use correctly sized copper or stainless steel pipes in solar heating system on both the solar and potable water loops. All connections to and from the SolVelox must be copper or stainless steel.

Figure 10 - Copper Flashing



Installing the Temperature Sensor

1. Strap the PT1000 probe sensor to the copper pipe at the collector outlet using a stainless steel screw clamp as shown in **Figure 11a** or use the SOLARHOT thermal well.
2. Feed the sensor wire through the gooseneck of the copper flashing as in **Figure 11b**. The flashing can then be soldered to seal it from leaks.
3. All of the exposed copper, as well as the sensor itself, needs to be **completely covered** with insulation and UV jacketing. For the sensor to operate correctly it must be isolated from exterior conditions.

Pipe Runs

Use 3/4" copper tubing. All pipe runs must have at least a 10° slope in a Drainback system to allow the collectors to drain out completely (All pipe runs to and from the collector should have at least a 10° slope unless rigid and well supported copper pipes are used, in which case the slope can be 1/4" per foot). All pipes should be wrapped with at least 3/4" thick insulation. We recommend 1" elastomeric insulation. Outdoor pipes should also be jacketed with UV protection material of some sort to protect them from moisture and ultraviolet deterioration. We recommend Nomaco K-Flex LS with Speedline

Figure 11a - Sensor Installation



Figure 11b - Sensor Installation



Smoke Safe PVC Fitting Covers and vinyl tape. All pipes must be well-supported or they will sag. Sagging pipes may trap water. Hangers should spread the load so that the insulation is not compressed. Place supports every 4.7 feet.

Installing the Tempering Valve

Refer to the manufacturer's instructions for

⚠ WARNING Do not use plastic piping

PEX, PVC and other forms of non-metal pipes will burst at solar temperatures. Only use correctly sized copper or stainless steel pipes in solar heating system on both the solar and potable water loops. All connections to and from the SolVelox must be copper or stainless steel.

⚠ WARNING Burn and Scald Hazard.

Be sure to install the Watts 1170-M2 hot water temperature valve to control water temperature at a safe operating level. Carefully follow the manufacturer's procedures for installation to ensure accurate water temperature sensing and effective control operation.

NOTICE If the water storage tanks are located in or above living spaces, a drip pan with a drain line to the outside of the building is required.

information on installing the tempering valve.

Installing the Drainback Tank

1. The Drainback tank should be located higher than the pumping station and installed in a fashion that allows filling. **Figure 12**
2. Position the pressure relief valve on the top of the tank as shown in **Figure 13**. SolarHot stainless steel 10-gallon Drainback tanks include a sight glass for easy monitoring.
3. Refer to **Figure 14** for piping the Drainback

Figure 12 - Drainback Tank



Figure 14 - Drainback Tank Relief Valve Piping

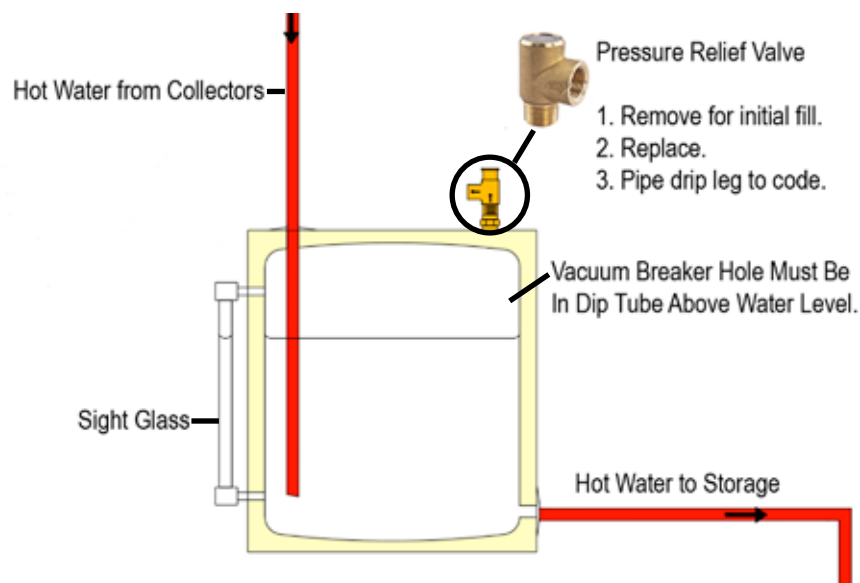


Figure 13 - Pressure Relief Valve



relief valve.

NOTICE Flow meter:

If using a Drainback tank other than SOLARHOT, use copper tees to install a sight glass such as the Conbraco 20-100: Standard Pattern Bronze Water Gauges OR install a flow meter at the same level as the Drainback tank on the collector feed side of the loop. A flow meter in a Drainback system must allow backflow. The SOLARHOT P-G-FMS535 is a .5-5 gpm flow meter suitable for 40-128 sq ft of collector area.

Mounting the SolVelox on the Storage Tank (residential systems only)

1. Confirm that the P&T valve is on the side of the tank and not on top. If it is on the top of the tank, unscrew it and place it in the port on the side of the tank if a side port is available.
2. Use needle nose pliers to remove the heat trap from the hot side of the tank.
3. Feed the solar dip tube into the tank, closed end down into the port previously noted as the “hot” port until it seats.
4. Place the bracket over the SolVelox and place the assembly on the side of the tank. The side of the SolVelox should be 1” to the left of the top electrode cover. The bracket should lie flat on the top of the tank. Scribe the tank to match the bracket location.
5. Using two #10 - 16 x 3/4” self-drilling screws, screw the top of the bracket to the top of the hot water tank. Ensure that the vertical section of the bracket above the heat exchanger is flush with the side of the tank before you drive in the screws.
6. Seek assistance to make sure you get the product snug on the tank, then while holding the bracket and the SolVelox firmly against the tank, drive four #10-16 x 3/4” self-drilling screws into the bracket with two just above and two just below the heat exchanger. It is critical that you hold the bracket and SolVelox firmly against the tank at this point, otherwise it will be loose when you stand the tank upright.
7. Connect a 3/4” brass tee to the cold water inlet to the tank as in **Figure 15**.
8. Using 3/4” copper pipe and fittings or 3/4”

MxF flexible stainless steel pipe, join the top right ball valve on the SolVelox assembly with the tee connected to the cold inlet. This is the cold water input to the SolVelox.

9. Using 3/4” pipe and fittings or 3/4” MxF flexible stainless steel pipe, connect the hot water inlet (where you previously installed the solar dip tube) to the second ball valve from the right on the SolVelox. This is the hot water return to storage.
10. Connect the line from the bottom of the Drainback tank to the SolVelox via the second ball valve from the left.

Figure 15 - SolVelox Piping



Installing the Differential Control

Your Drainback system is automated by the differential control located on the face of the SolVelox cover, as shown in **Figure 16**.

When installing the SolVelox pump package, consult the appliance manufacturer’s instructions for additional information on wiring, installing the three sensors, and programming the control. **See also Figure 17.**

1. For the first sensor, 50 feet of 18-gauge sensor wire is included to reach the panel collectors. If you require more wire for your system design, use UV stable (black) 18 gauge sensor wire. This sensor is denoted by T1 on a Steca controller display.
2. The lower tank sensor is approximately 6 feet long. Remove the lower access panel shown in **Figure 18** and place the sensor firmly against the interior tank surface. The

heavy insulation should hold it securely in place. While the panel is open, turn the bottom heating element to its lowest set point. This sensor is denoted by T2 on a Steca display.

- The short sensor wire is to be installed on the pipe returning to the backup water heater (potable water return) from the heat exchanger by using a stainless steel screw clamp. Place the clamp on the pipe as far from the control as possible. Insulate over the sensor (T3 on Steca display).



Figure 16 - SolVelox

WARNING Burn and Scald Hazard.

Excessive water temperatures could cause explosion, burns, scalding, pressure relief flooding and fitting leaks. Carefully follow the outlined procedures for temperature sensor installation to ensure accurate water temperature sensing and effective control operation.

Figure 17 - SolVelox Wiring Diagram

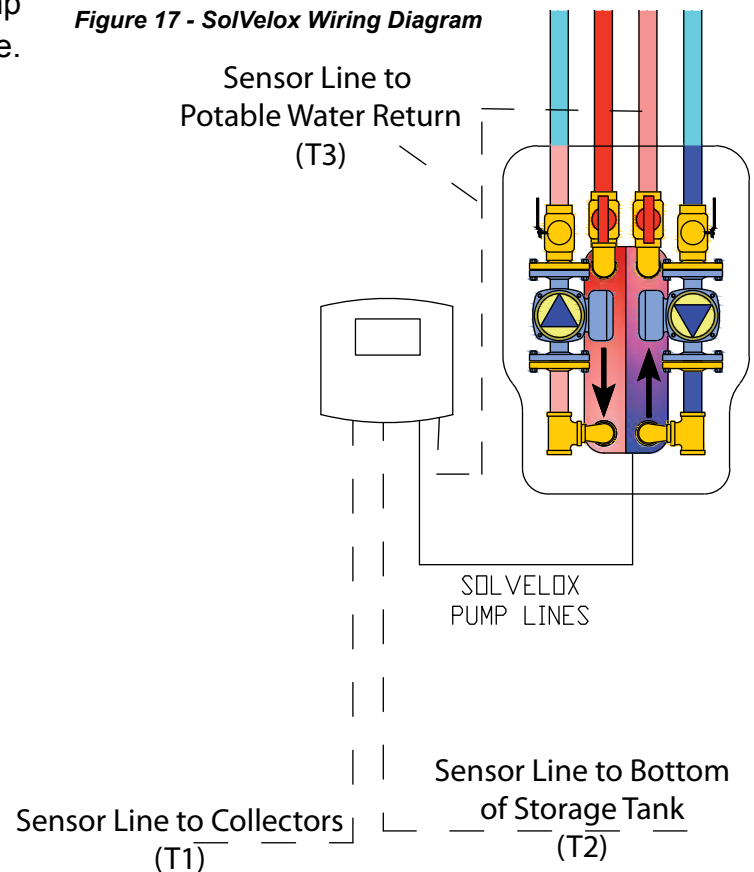


Figure 18 - Lower Tank Sensor



Check Collector Loop for Leaks

1. Open all shut-off valves on the collector loop before the system has been filled with distilled water.
 2. Attach a female-to-male adapter to the drain valve on the bottom left of the SolVelox.
 3. Open the drain valve and attach the gas test block which includes the with pressure gauge.
 4. Apply 60 psi pressure for 15 minutes. Any drop in pressure during that time indicates a leak.
 5. Find the source of the leak and repair it. Repeat this procedure until the loop holds pressure.
4. Replace the pressure relief valve.
 5. Pressurize system to 15 psi
 6. Vent the pumps by loosening the screw on the faceplate until the fluid flows freely. Re-tighten screw.
 7. Turn on system and let it run for 5 minutes.
 8. Adjust the upper element of the water heat to a maximum of 120° F for backup heat.
 9. Set the high limit on the control to no more than 149° F. Refer to the differential control owner's manual for instructions on setting the control's limits.

Filling and Starting the System

1. Flush system to clean out any debris that may be in the pipes or collectors.
2. Confirm that all shut-off valves are fully open.
3. Remove the pressure relief valve from the top of the Drainback tank and fill the system with distilled water as shown in **Figure 19**. Use 8-9 gallons of distilled water depending on the length of your piping. 0.025 gallons of water fill a foot of 3/4" copper piping, so 9 gallons will fill 360 feet of 3/4" copper piping. Add water until sight glass is completely full.

Figure 19 - Filling the System



Check System Operation

Let the system run for 15 minutes on a sunny day, preferably near noon. Three temperatures will show on the differential control: the collector outlet temperature, the bottom of the tank temperature, and the temperature of the water returning to the tank. Typically you should see the temperature at the bottom of the tank vary from 60-80° F (city water temperature) to 185° (high limit set on the control). The water at the top of the tank will be typically higher than the water at the bottom, but should not exceed the high limit set on the control. The Temperature and Pressure Relief Valve on the storage tank is set to 210° F.

The system will automatically turn on the pumps when the collector temperature is 16° higher than the water temperature at the bottom of the tank. It will shut off the system when the temperature differential is 8° F. Collector temperatures may rise well above 200° F, but the system will not run beyond the high limit set on the control.

A system correctly installed will show the water returning to the tank to be at least 3-10° F warmer than the water temperature at the bottom of the tank.

Operation

Please refer to the differential control user's manual for system operation or adjustments.

Vacation Settings

If the system is not to be used for any extended period of time, the system should be turned off at the differential control.

1. On a Steca control, set the switch on its left side to the "OFF" position.
2. To resume operations, set the switch to "AUTO."

Emergency Shut Off

1. If there is a leak or another issue requiring the collector loop to be drained, turn the system off by setting the switch on the left side of the differential control to the "OFF" position.
2. Attach a hose to the drain valve on the lower left of the SolVelox. **See Figure 20.**
3. Open the drain valve, pouring the fluid into a bucket or tub.

Maintenance

Your solar water system requires very little by way of maintenance, but a few regular system checks can extend the life of your system well beyond 20 years.

Freeze Protection

This system is designed to protect itself from freeze damage as long as the Drainback tank remains above 32°F. Freeze tolerance limits are based upon an assumed set of environmental conditions. In the event of extreme or prolonged cold weather, protect your system by shutting down the system and draining the collector loop as described in the "Vacation Settings" and "Emergency Shut- Off" sections.

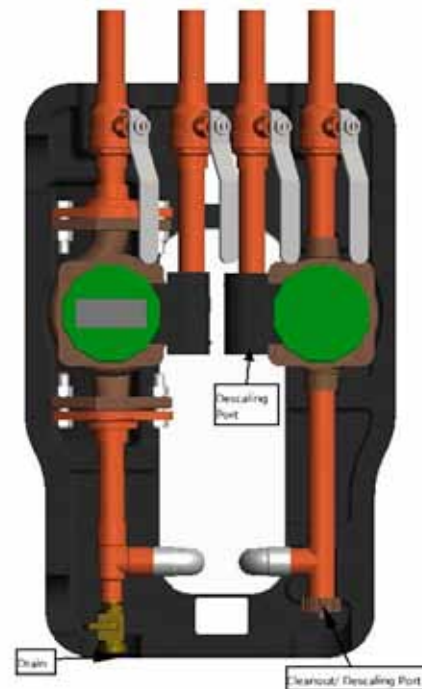
Clear Sediment from Strainer

1. Turn off your solar water system with the switch on the side of the differential control

and disconnect the power to the SolVelox by unplugging it from the wall outlet.

2. Close the two shut-off flanges on the right side of the SolVelox. Refer to **Figure 21.**
3. Open the clean-out port. **See Figure 20.**
4. Remove any sediment buildup from the clean-out port.
5. Close and tighten the clean-out port.
6. Return shut-off flanges to the open position and reconnect the power to the SolVelox.

Figure 20 - SolVelox Ports



WARNING Burn Hazard.

Exercise extreme caution when draining, as the water in the port may be dangerously hot.

Figure 21 - Shut-off Flanges



Descaling the Heat Exchanger

1. Turn off your solar water system with the switch on the side of the solar differential control and disconnect the power to the SolVelox by unplugging it from the wall outlet.
2. Close the two ball valves on the right side of the SolVelox. Refer to **Figure 22**.
3. Unscrew the plugs to open the descaling and clean-out ports as shown in **Figure 20**.
4. Remove any sediment buildup from the clean-out port.
5. Flush the heat exchanger with a weak solution of white vinegar and water.
6. Close and tighten the descaling and clean-out ports.
7. Return ball valves to the open position and reconnect the power to the SolVelox. Bleed air from face of pump.

Add Distilled Water or Change Heat Transfer Fluid

Your system will perform best when you have the maximum amount of heat transfer fluid in the collector loop. Check fluid levels annually and add distilled water until the sight glass is completely full. You can check the water level in the Drainback tank with a sight glass or you can install a flow meter on the same level as the Drainback tank on the collector feed side of the loop. Note: A flow meter in a Drainback system must allow backflow. The Letro LDF360B is a .5-5 gpm flow meter allowing backflow and suitable for 40-128 sq. ft. of collector area.

NOTICE There must be enough air in the system so that the collectors and exposed pipes are empty when the system is not running.

Pumps

The circulation pumps have a life expectancy of 5-10 years. If a pump should require servicing or replacement...

1. Turn off the system with the differential control.
2. Close all the ball valves at the top of the SolVelox. Leave the system off for several hours until the pumps are completely cooled to room temperature.
3. Solar pumps are flanged so they can be easily removed by loosening the flange's nuts and bolts. Potable loop pumps use bolts and must be unscrewed.

Service

To obtain service for your SolVelox™, notify the dealer who installed or sold the SolVelox™. In notifying your dealer, provide identification of your SolVelox™, date of purchase (with proof) and the nature of the defect. Ship the SolVelox™ complete in the assembled condition. Use adequate packaging to prevent damage to the pump during shipment.

To obtain the location of the nearest authorized SOLARHOT service and/or distribution facility, call (919) 439-2387 or write to:

SOLARHOT Ltd.

2800 Perimeter Park Dr. Suite A
Morrisville, NC 27560

or on the web at:

<http://www.solarhotusa.com>

email: sales@solarhotusa.com

WARNING Burn Hazard.

Exercise extreme caution when draining, as the water in the port may be dangerously hot.

Parts List:

SOLARHOT SOVELOX DB
 S-SV-DB100 S-SV-DBHC87 S-SV-DBE78-120
 S-SV-DBS80-120 S-SV-DBHC58 S-SV-DBE64-120
 S-SV-DBS64 S-SV-DBSEC40 S-SV-DBE64
 S-SV-DBS40 S-SV-DBSEP40 S-SV-DBE52
 S-SV-DBS32 S-SV-DBUMA64-120 S-SV-DBE40
 S-SV-DBUMA40-120 S-SV-DBUMA64 S-SV-DBE32
 S-SV-DBUMA40 S-SV-DBE96-120 S-SV-DBE80-120

Congratulations on the installation of your SOLARHOT SolVelox System. Correctly installed and maintained, you system should provide you with many years of uninterrupted solar hot water. The solar collectors are designed to last 25-35 years, electric water heaters 10-20, pumps, controls and valves 5-10. Local water quality and usage will greatly affect life expectancies.

Solar Collector:

S-SV-DBE32 1x SOLARHOT S-SC-126D32
 S-SV-DBE32G 1x SOLARHOT S-SC-126D32
 S-SV-DBE40 1x SOLARHOT S-SC-126D40
 S-SV-DBE52 2x SOLARHOT S-SC-126D26
 S-SV-DBE64 2x SOLARHOT S-SC-126D32
 S-SV-DBE64-120 2x SOLARHOT S-SC-126D32
 S-SV-DBE64G 2x SOLARHOT S-SC-126D32
 S-SV-DBE78-120 3x SOLARHOT S-SC-126D26
 S-SV-DBE80-120 2x SOLARHOT S-SC-126D40
 S-SV-DBE80G 2x SOLARHOT S-SC-126D40
 S-SV-DBE96-120 3x SOLARHOT S-SC-126D32
 S-SV-DBE96G-120 3x SOLARHOT S-SC-126D32
 S-SV-DBS32 1x SOLARHOT S-SC-126S32
 S-SV-DBS40 1x SOLARHOT S-SC-126S40
 S-SV-DBS64 2x SOLARHOT S-SC-126S32
 S-SV-DBS64G 2x SOLARHOT S-SC-126S32
 S-SV-DBS80-120 2x SOLARHOT S-SC-126S40
 S-SV-DB100S64 2x SOLARHOT S-SC-126S32
 S-SV-DBP64-120 2x SOLARHOT S-SC-126P32
 S-SV-DBP80-120 2x SOLARHOT S-SC-126P40
 S-SV-DBUMA40 1x Solene SLAR40
 S-SV-DBUMA40-120 1x Solene SLAR40
 S-SV-DBUMA64 2x Solene SLAR32
 S-SV-DBUMA64-120 2x Solene SLAR32
 S-SV-DBSEP40 1x SunEarth EP-40
 S-SV-DBSEC40 1x SunEarth EC-40

Solar Storage Tank:

80 gallon tank 120 gallon
 Whirlpool EE3Z80HD055V Rheem 81VR120TC-1
 American Premier E62-80H-045DV Lochinvar FTA120K
 Rheem 81VR80TC-1 American E62-119R-045D
 Lochinvar FTA082K Bradford White MS120R6S
 Bradford White MS800R6SS AO Smith SUN 120
 AO Smith ProMax SUN80

Pumps: Armstrong Wilo Taco
 Collector Loop Glycol Astro 30B Star 16B 006B
 Collector Loop Drainback Astro 70B Star 32B 009B
 Tank Loop Astro 20B Star 8BS 003B
 Controller: Steca Differential Control TR 0301U, requires PT1000 probe or lug replacement sensors
 Advanced Control, requires PT1000
 Heat Exchanger: SOLARHOT P-HX-214412

System operating parameters:

- Flow meter should read about 5 gpm on the collector loop and 3.5 on the tank loop BUT MAY VARY BASED ON ACTUAL SYSTEM DESIGN

Gas Backup Systems:

S-SV-DBP64G, S-SV-DBP80G, S-SV-DBSEP40G, S-SV-SEC40G

Congratulations on the installation of your SOLARHOT SolVelox System. Correctly installed and maintained, you system should provide you with many years of uninterrupted solar hot water. The solar collectors are designed to last 25-35 years, electric water heaters 10-20, pumps, controls and valves 5-10. Local water quality and usage will greatly affect life expectancies.

Solar Collector:

S-SV-DBP64G 1x SOLARHOT S-SC-126P32
 S-SV-DBP80G 1x SOLARHOT S-SC-126P40
 S-SV-DBSEP40G 1x SunEarth EP-40
 S-SV-DBSEC40G 1x SunEarth EC-40

Solar Storage Tank:

80 gallon tank 120 gallon
 Whirlpool EE3Z80HD055V Rheem 81VR120TC-1
 American Premier E62-80H-045DV Lochinvar FTA120K
 Rheem 81VR80TC-1 American E62-119R-045D
 Lochinvar FTA082K Bradford White MS120R6S
 Bradford White MS800R6SS AO Smith SUN 120
 AO Smith ProMax SUN80

Pumps: Armstrong Wilo Taco
 Collector Loop Glycol Astro 30B Star 16B 006B
 Collector Loop Drainback Astro 70B Star 32B 009B
 Tank Loop Astro 20B Star 5B 003B
 Controller: Steca Differential Control TR 0301U, requires PT1000 probe or lug replacement sensors
 Heat Exchanger: SOLARHOT P-HX-210512

Evacuated Tube Systems

Part List:

SOLARHOT SOVELOX DB
S-SV-DBET30 and S-SV-DBET60
S-SV-DBET30-120 or S-SV-DBET60-120

Congratulations on the installation of your SOLARHOT SolVeloX System. Correctly installed and maintained, your system should provide you with many years of uninterrupted solar hot water. The solar collectors are designed to last 25-35 years, electric water heaters 10-20, pumps, controls and valves 5-10. Local water quality and usage will greatly affect life expectancies.

Solar Collector:

S-SV-DBET30 - single Apricus AP 30

S-SV-DBET60 - two Apricus AP60

S-SV-DBET30-120 - single Apricus AP 30

S-SV-DBET60-120 - two Apricus AP60

Solar Storage Tank:

80 gallon tank	120 gallon
Whirlpool EE3Z80HD055V	Rheem 81VR120TC-1
American Premier E62-80H-045DV	Lochinvar FTA120K
Rheem 81VR80TC-1	American E62-119R-045D
Lochinvar FTA082K	Bradford White MS120R6S
Bradford White MS800R6SS	AO Smith SUN 120
AO Smith ProMax SUN80	

Pumps:	Armstrong	Wilo	Taco
Collector Loop Glycol	Astro 30B	Star 16B	006B
Collector Loop Drainback	Astro 70B	Star 32B	009B
Tank Loop	Astro 20B	Star 5B	003B

Controller: Steca Differential Control TR 0301U, requires PT1000 probe or lug replacement sensors

Heat Exchanger: SOLARHOT P-HX-210512

Limited Ten Year
MANUFACTURER'S WARRANTY
For SolarHot Collectors

SolarH₂Ot Limited warrants to buyer for a period of ten (10) years from the date of sale that the equipment at the time of shipment will be free from defects of design, material and workmanship.

- If any defects occur during the warranty period, SOLARHOT's sole obligation shall be limited to alteration, repair or replacement at SOLARHOT's expense, F.O.B. Factory, of parts or equipment, which upon return to SOLARHOT and upon SOLARHOT's examination prove to be defective.
- Equipment and accessories not manufactured by SOLARHOT are warranted only to the extent of and by the original manufacturers' warranty.
- SOLARHOT shall not be liable for damage or wear to equipment caused by abnormal conditions, acts of God, failure to properly prime or to operate equipment without flow or caused by corrosives, abrasives or foreign objects.

Please note that the warranty does not apply to conditions or damage caused by:

1. A failed component or part that is not a part of the SOLARHOT collector.
2. Freezing conditions.
3. Misuse, abuse, neglect, accident, or alteration.
4. Cosmetic discoloration of the frame-wall, absorber plate, or glazing over time.
5. Glass breakage.
6. The introduction of harmful chemicals, caustic fluids, or liquids deleterious to copper tubing, including improperly applied or maintained heat transfer fluids and chlorinated water. The use of SOLARHOT collectors for pool or spa heating is not covered by this warranty unless the pool or spa water is isolated from the collector through the use of a heat exchanger.
7. Heat transfer fluids other than distilled water or propylene glycol are used.
8. Propylene glycol pH levels exceeding 10 or falling below 8.
9. Stagnation in excess of 30 days.
10. Excessive pressure.
11. Excessive flow rates.
12. Improper plumbing configurations.
13. Clouding or condensation naturally resulting from temporary intrusions of moisture into the collector.
14. Acts of God.
15. Installation methods, including mounting, that do not conform to relevant national, state, or local codes and ordinances, good industry practices, or current applicable SOLARHOT manuals, diagrams, or installation instructions.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

IN NO EVENT SHALL SOLARHOT BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES.

After one (1) year of warranty, freight and shipping costs are the responsibility of the owner.

Limited Two Year
MANUFACTURER'S WARRANTY
For SolVelox Drainback System

SolarH₂Ot Limited warrants to buyer for a period of twenty-four (24) months from the date of being placed in service (but not to exceed thirty (30) months after the date of shipment) that the equipment at the time of shipment will be free from defects of design, material and workmanship.

- If any defects or malperformance occur during the warranty period, SOLARHOT's sole obligation shall be limited to alteration, repair or replacement at SOLARHOT's expense, F.O.B. Factory, of parts or equipment, which upon return to SOLARHOT and upon SOLARHOT's examination prove to be defective.
- Equipment and accessories not manufactured by SOLARHOT are warranted only to the extent of and by the original manufacturers' warranty.
- SOLARHOT shall not be liable for damage or wear to equipment caused by abnormal conditions, acts of God, failure to properly prime or to operate equipment without flow or caused by corrosives, abrasives or foreign objects.
- The SolVelox is only to be used in non-corrosive aqueous environments, other useage void this warranty.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

IN NO EVENT SHALL SOLARHOT BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES.

5 year extended warranty is available - please speak to your installer or dealer.

DRAINBACK SYSTEM



SOLARHOT Ltd.

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