



INSTALLATION & OPERATION MANUAL

***** READ ALL INSTRUCTIONS THOROUGHLY FROM START TO FINISH BEFORE BEGINNING INSTALLATION. IF THESE INSTRUCTIONS ARE NOT PROPERLY FOLLOWED, DAMAGE MAY OCCUR TO THE PRODUCT AND POOL EQUIPMENT. SOLAR POOL SUPPLY ISN'T RESPONSIBLE FOR ANY DAMAGE OR FAILURE RESULTING FROM IMPROPER INSTALLATION. *****

***** SOLAR PANELS ARE OFTEN INSTALLED ON THE ROOFS OF BUILDINGS. UNLESS YOU ARE VERY FAMILIAR WITH WORKING ON ROOFS AND HAVE THE PROPER SAFETY EQUIPMENT FOR SUCH WORK, YOU SHOULD HIRE A PROFESSIONAL TO PERFORM THE INSTALLATION. FAILURE TO USE PROPER SAFETY EQUIPMENT AND PRACTICES MAY RESULT IN SERIOUS INJURY OR DEATH. *****

***** BEFORE BEGINNING INSTALLATION, INVENTORY ALL SYSTEM COMPONENTS AGAINST THE PARTS LIST. DON'T BEGIN INSTALLATION IF COMPONENTS ARE MISSING. SOLAR POOL SUPPLY ISN'T RESPONSIBLE FOR ANY COSTS ASSOCIATED WITH INSTALLATION DELAYS DUE TO MISSING COMPONENTS. *****

***** BEFORE REMOVING THE SOLAR PANELS FROM THE BOX, VERIFY PANEL SIZE AND SUFFICIENT MOUNTING SPACE TO ACCOMMODATE THE ENTIRE SYSTEM. DUE TO THE MATERIAL TYPE, THESE PANELS ARE SUSCEPTIBLE TO DAMAGE IF MISHANDLED. DAMAGED PANELS CAN'T BE RETURNED. *****

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2. Critical Installation Do's & Don'ts

- **DON'T SECURE THE BOTTOM INLET HEADER.** Solar panels thermally expand and contract as they heat up and cool down, so the bottom header can't be solid mounted. The standard mounting hardware design secures the top outlet header only and secures the body of the panel with hold-down straps, so the bottom header is free to move as the panels thermally expand and contract. If the panels are located in an area where high winds occur, you can properly secure the bottom inlet header with Inlet Header Hold-Down Bracket Assembly With Tension Spring (#10002-1). This assembly features a spring mount that secures the bottom header, but still allows the panel to properly expand and contract. The Inlet Header Hold-Down Bracket Assembly With Tension Spring is the only method that can be used to secure the bottom header. Securing the bottom header in any other way will damage the panels. Refer to section 8. Mounting The Panels for proper installation procedures.
- **ONLY USE 7" SYSTEM CONNECTOR HOSES TO CONNECT PVC PIPE TO THE PANELS.** The 7" System Connector Hose (#60691-1) and Pipe Connector (#30089-1) will be used to connect PVC pipe to the bottom inlet and top outlet headers of the panels. These longer 7" system hoses provide additional flexibility for the panels and pipe to move as thermal expansion and contraction occurs. Using any other connector hoses will damage the panels. Refer to section 8. Mounting The Panels for proper installation procedures.
- **ALWAYS INSTALL THE SYSTEM TO ALLOW AUTOMATIC GRAVITY DRAINAGE.** The solar panels should be pitched at least 1/8" per foot of panel to allow water to properly drain. The solar feed inlet pipe should never be routed higher than the bottom inlet header of the panels so that water can gravity drain out of the panels and back down the solar feed inlet pipe. The Drain Loop Assembly (#16122) included in this system will allow that automatic gravity drainage to occur when the pump is off. Freeze damage can occur at temperatures as low as 40 degrees Fahrenheit, so there can be no water in the panels when these weather conditions occur. If automatic gravity drainage isn't possible the system must be manually drained any time these weather conditions occur. Compressed air will not remove all the water, so the panels must be properly pitched to remove all water from the panel. Refer to section 9. System Piping for proper plumbing procedures.

3. Introduction

Please read this manual thoroughly before performing the installation.

We strongly recommend reading the "Critical Do's & Don'ts" section on Page 2 first to get a good understanding of the most critical installation requirements that commonly get overlooked.

This manual provides a detailed step-by-step installation procedure for a SwimEasy TT solar pool heating system. If the installation procedure is followed correctly, and all of the proper components are used, the installed system should provide years of trouble-free operation, savings and enjoyment.

This system was designed to include as many of the required components as possible. However, it can't address all the unique or individual circumstances possible, so you will need to acquire additional components to complete the installation.

As the installer, you are responsible for exercising good judgment when installing the system to protect the long term integrity of the product as well as the mounting surfaces.



BURN HAZARD! If water is left sitting inside the panel the water will become hot enough to burn you. It is important that nobody is in the pool when the solar panel system is initially turned on. Allow water to cycle through the system enough to remove all the hot water. Once the hot water has dissipated into the pool it is safe to enter. This procedure must be followed every time the solar system is turned on.



Solar panels are often installed on the roofs of buildings. Unless you are very familiar with working on roofs and have the proper safety equipment for such work, you hire a professional to perform the installation. Failure to use proper safety equipment and practices may result in serious injury or death.



NOTICE TO ALL CUSTOMERS REGARDING FREEZE DAMAGE: All systems **MUST** be drained of all water whenever temperatures reach 40 degrees Fahrenheit. These conditions can occur in virtually any weather climate and applies to all customers. Solar pool heating panels can incur freeze damage starting at 40 degrees Fahrenheit, so taking the proper precautions and preventative measures will ensure the product performs at its highest potential and maximizes lifespan. Freeze damage isn't covered under the warranty policy.



Walking on the panels should be avoided as much as possible. If you must, walk as gently as possible and never step closer than 14" from either top or bottom header.



Remember to be EXTREMELY CAREFUL handling and moving the panels. Don't drag, drop or pull on the panels. They are plastic material and are easily damaged if mis-handled.



The solar panels are packaged in both doubles and singles (depending on the system size), which are rolled in our specialty rolling machine and secured with straps. BEFORE CUTTING THE STRAPS make sure the panels are the correct size and you have adequate space to mount them. In a return scenario it is extremely difficult to roll the panels up without the proper machinery, so damage is highly likely if you have to roll them yourself. Damaged panels can't be returned.

4. Technical Specifications



Technical Specifications

◆ Dimensions	1.5" I.D. Header			2" I.D. Header		
Panel Size	4'x8'	4'x10'	4'x12'	4'x8'	4'x10'	4'x12'
Overall Panel Length	8'	10'	12'	8'	10'	12'
Absorber Plate Width	47"	47"	47"	47"	47"	47"
Header Width	50.5"	50.5"	50.5"	50.5"	50.5"	50.5"
Header O.D.	1.9"	1.9"	1.9"	2.4"	2.4"	2.4"
Header I.D.	1.5"	1.5"	1.5"	2"	2"	2"
Total Panel Area	31.4	39.3	47.3	31.4	39.3	47.3

◆ Weights	1.5" I.D. Header			2" I.D. Header		
Dry Weight	14.3 lbs	17.1 lbs	21.3 lbs	15.3 lbs	18.1 lbs	22.3 lbs
Filled Weight	35.1 lbs	41.6 lbs	48 lbs	41.1 lbs	47.6 lbs	54 lbs
Filled Weight Per Sq Ft	1.12 lbs	1.06 lbs	1.01 lbs	1.31 lbs	1.2 lbs	1.14 lbs
Fluid Capacity	2.5 gal	2.9 gal	3.2 gal	3.1 gal	3.5 gal	3.8 gal

◆ Flow Rates	1.5" I.D. Header			2" I.D. Header		
Maximum GPM	10 GPM	10 GPM	10 GPM	10 GPM	10 GPM	10 GPM
Minimum GPM	2.5 GPM	2.5 GPM	3 GPM	2.5 GPM	2.5 GPM	3 GPM
Recommended GPM	3.3 GPM	4 GPM	5 GPM	3.3 GPM	4 GPM	5 GPM
Max # Of Panels Per Row	12	12	10	14	14	12

◆ Thermal Performance	1.5" I.D. Header			2" I.D. Header		
BTU's Per Standard Day	31,500	39,300	47,200	31,500	39,300	47,200
Thermal Perf. Equation	n = 85.8 - 3.42					
Incident Angle Modifier	Kqr = 1.0 - 0.03					

◆ Pressures

- ◆ Pressure Drop: 0.30 ft Head Loss @ Recommended GPM • 0.20 ft Head Loss @ Min. GPM •
- ◆ Maximum Fluid Pressure: 85 PSI @ 80°F • Recommended Operating Pressure: 35 PSI @ 140°F •

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5. Installation Kits & Components

This section details the SwimEasy installation kits included with each DIY System Kit that are required to install a SwimEasy solar pool heating system in one single row. These DIY System Kits are designed as a "base" starting point. Given the endless variables to each installation it is impossible to include all of the materials and components necessary to complete each and every installation. Additional components may be required depending on your specific installation and layout requirements. Below is a list of items that may be required to complete the installation of your system.

- Schedule 40 PVC Pipe
- PVC Cement (Primer & Medium)
- Lag Screws
- Flow Meter
- Schedule 40 PVC Fittings
- Check Valve
- High Quality Sealant
- Zip Ties
- 3-Port Diverter Valve
- 2-Port Diverter Valve
- Ball Valve
- Pipe Support Brackets

12034-1(1.5" Header) or 12034-2 (2" Header): PANEL INSTALLATION KIT

One of these kits is required for each panel. Your DIY System Kit will include one panel installation kit for each solar panel. It contains the parts necessary to connect the panels together and secure them to the mounting surface. Each Panel Installation Kit contains:

- (1) #50069 - Outlet Header Hold-Down Bracket
- (1) #303401 - Flashing Base, Outlet Header Bracket
- (2) #50006 - Strap Bracket, Stainless Steel
- (2) #30340-2 - Flashing Base, Strap Bracket
- (5) #60003-1 (1.5") or #60003-2 (2") - Hose Clamp, Stainless Steel
- (2) #60690-1 (1.5") or #60690-2 (2") - Panel Connector Hose, 3.75" Long



12043-1 (1.5" Header) or 12043-2 (2" Header): ROW INSTALLATION KIT

One of these kits is required for each row of panels. Your DIY System Kit will include one row installation kit. It contains the parts necessary to connect the feed and return lines to one row of panels, cap the lower header and install the vacuum relief valve at the top header to allow gravity drainage of the system. If your specific layout requires more than one row of panels, you will need one additional row installation kit for each additional row of panels. The Row Installation Kit contains:

- (1) #50069 - Outlet Header Hold-Down Bracket
- (1) #303401 - Flashing Base, Outlet Header Bracket
- (2) #50006 - Strap Bracket, Stainless Steel
- (2) #30340-2 - Flashing Base, Strap Bracket
- (4) #10011 - Strap Clamp, Stainless Steel
- (4) #60003-1 (1.5") or #60003-2 (2") - Hose Clamp, Stainless Steel
- (1) #30061-1 (1.5") or #30061-2 (2") - End Cap
- (1) #10003-1 (1.5") or #10003-2 (2") - Vacuum Relief Valve
- (2) #60691-1 (1.5") or #60691-2 (2") - System Connector Hose, 7"
- (2) #30089-1 (1.5") or #30089-2 (2") Pipe Connector, CPVC



16007-1: HOLD-DOWN STRAP, 100 FT BULK ROLL

Two rows of strap will be located across the body of the panels. The first row will be located 16" above the outside of the bottom inlet header. The second row will be placed according to the overall length of the panel. Your DIY System Kit includes one 100' bulk roll of hold-down strap.



6. Parts List



Panel Connector Hose
1.5" Header
Part #60690-1



Vacuum Relief Valve
1.5" Header
Part #10003-1



Panel Connector Hose
2" Header
Part #60690-2



Vacuum Relief Valve
2" Header
Part #10003-2



System Connector Hose
1.5" Header
Part #60691-1



Pipe Connector
1.5" Header
Part #30089-1



System Connector Hose
2" Header
Part #60691-2



Pipe Connector
2" Header
Part #30089-2



End Cap
1.5" Header
Part #30061-1



End Cap
2" Header
Part #30061-2



Hose Clamp
2" Header
Part #60003-2



Hose Clamp
1.5" Header Part
#60003-1



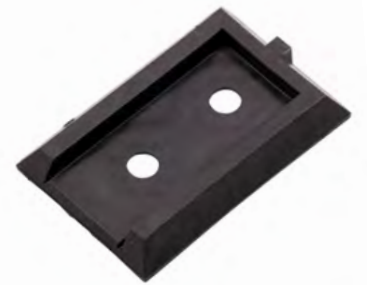
Strap Bracket
Part #50006



Flashing Base, Strap Bracket
Part #30340-2



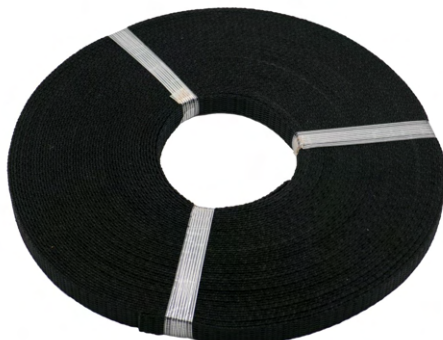
Outlet Header Hold-Down
Bracket
Part #50069



Flashing Base, Outlet
Header Bracket
Part #30340-1



Strap Clamp
Part #10011



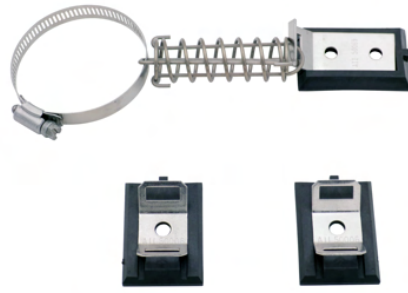
Hold-Down Strap, 100' Bulk Roll
Part #16007

7. Optional Accessories Available Separately

1.5" Header



Row Spacer Kit, 1.5" Header
Part #12017-1



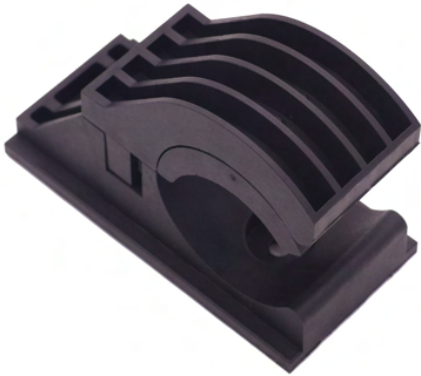
High-Wind Panel
Installation Kit, 1.5" Header
Part #12035-1



High-Wind Row
Installation Kit, 1.5" Header
Part #12143-1



Manual Drain 1.5" Header
Part #13074-1



Outlet Header Heavy-Duty
Mounting Bracket
Fits Both 1.5" & 2" Header
Parts #10121



Ultimate Aluminum Outlet
Header Mounting Bracket
1.5" Header
Part #10117-1



Pipe Support Bracket
1.5", White
Part #30284-1

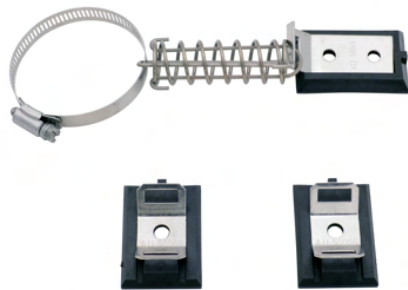


Pipe Support Bracket
1.5", Black
Part #30272-1

2" Header



Row Spacer Kit, 2" Header
Part #12017-2



High-Wind Panel
Installation Kit, 2" Header
Part #12035-2



High-Wind Row
Installation Kit, 2" Header
Part #12143-2



Manual Drain,
2" Header
Part #13074-2



Outlet Header Heavy-Duty
Mounting Bracket Fits Both
1.5" & 2" Header Parts
#10121



Ultimate Aluminum Outlet
Header Mounting Bracket
2" Header
Part #10117-2

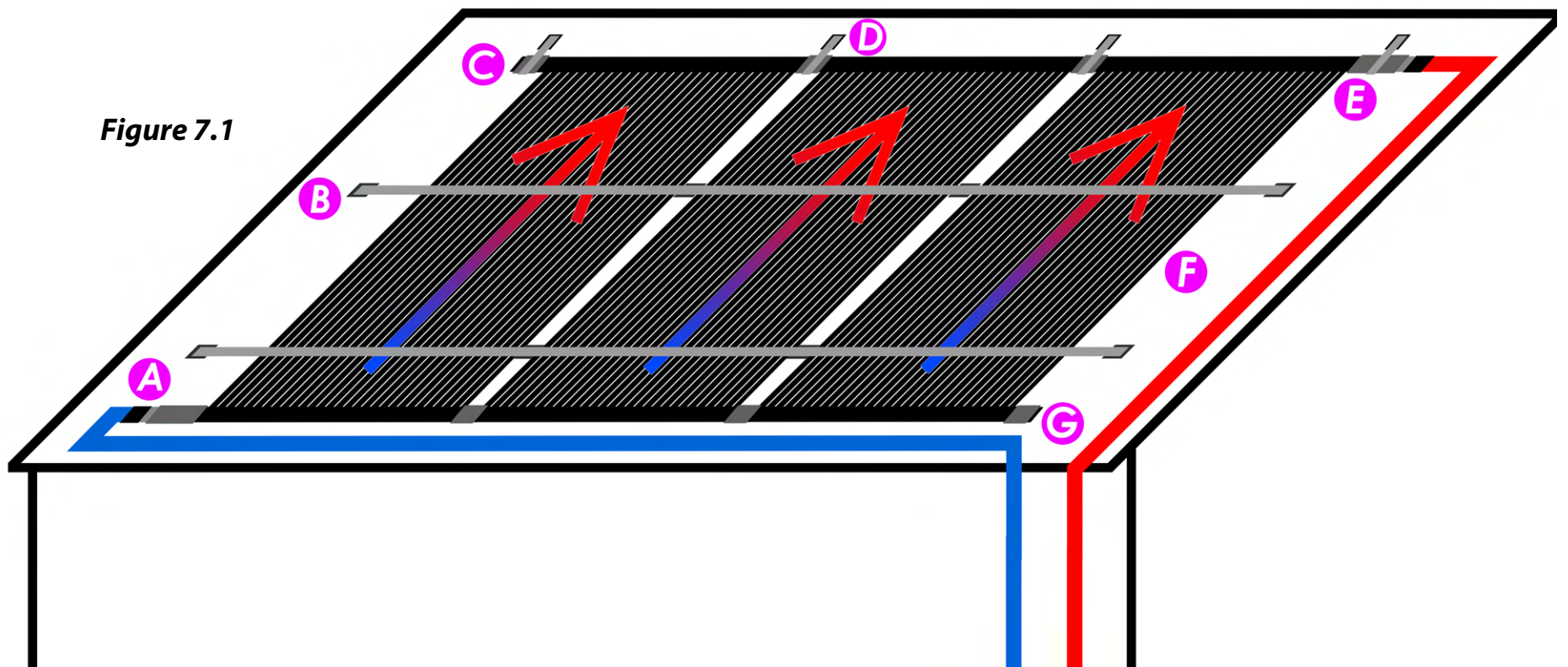


Pipe Support Bracket
2", White
Part #30284-2



Pipe Support Bracket,
2", Black
Part #30272-2

8. System Hardware Diagram



- A Inlet Feed Pipe Connection:** Figure 7.2 on the following page. Your solar inlet feed line pipe will connect to the bottom header utilizing the 7" System Connector Hose (#60691-1), Pipe Connector (#30089-1) and Hose Clamps (#60003-1). Your PVC pipe will cement to the pipe connector utilizing a PVC elbow or coupling fitting. This inlet pipe connection should be located on the opposite side of the top outlet pipe connection. Utilizing the 7" Connector Hose for the PVC pipe connection is critical to reduce stress on the panel as the panels and pipe thermally expand and contract.
- B Hold-Down Strap:** Figure 7.3 and 7.4 on the following page. The included hold-down strap components will secure the body of the panels to the mounting surface. The lowest strap should be positioned 16" up from the outside of the bottom inlet header. Don't locate this lowest strap any closer to the bottom inlet header.
- C Vacuum Relief Valve:** Figure 7.5 on the following page. The vacuum relief valve will be located on the top outlet header at the end of the row opposite of the solar return pipe connection. The vacuum relief valve allows air into the system so it can gravity drain.
- D Outlet Header Hold-Down Bracket Assembly:** Figure 7.6 on the following page. The included outlet header hold-down bracket components will allow you to secure the top outlet header to the mounting surface. You should never secure the bottom inlet header. The solar panels thermally expand and contract as they heat up and cool down, so the panel will be damaged if the bottom inlet header is secured. If the panels will be located in a high wind location/environment, you can properly secure the bottom inlet header with Inlet Header Hold-Down Bracket Assembly With Tension Spring (#10002-1), which is available separately and included in the High-Wind Panel Installation Kit (12035-1) referenced in Section 7 on Page #8.
- E Outlet Return Pipe Connection:** Figure 7.7 on the following page. Your solar outlet return pipe will connect to the top outlet header utilizing the 7" System Connector Hose (#60691-1), Pipe Connector (#30089-1) and Hose Clamps (#60003-1). Your PVC pipe will cement to the pipe connector utilizing an elbow or coupling PVC fitting. This outlet pipe connection should be located on the opposite side of the bottom inlet pipe connection. Utilizing the 7" Connector Hose for the PVC pipe connection is critical to reduce stress on the panel as the panels and pipe thermally expand and contract.
- F Solar Panels:** Figure 7.8 on the following page. The solar panels should be installed vertically with the main inlet/outlet headers running horizontally across the mounting surface. This orientation will aid gravity drainage and balance water flow through the system.
- G End Cap:** Figure 7.9 on the following page. The end cap will be placed on the bottom inlet header at the end of the row opposite of the solar inlet feed pipe connection. This caps off the bottom inlet header so the water will pressurize and push up the panel towards the top outlet header.

8. System Hardware Diagram, Cont.



Figure 7.2

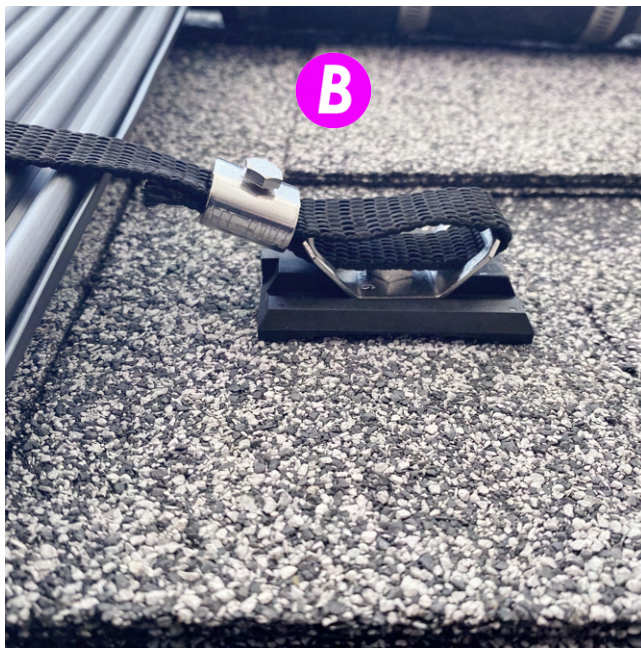


Figure 7.3

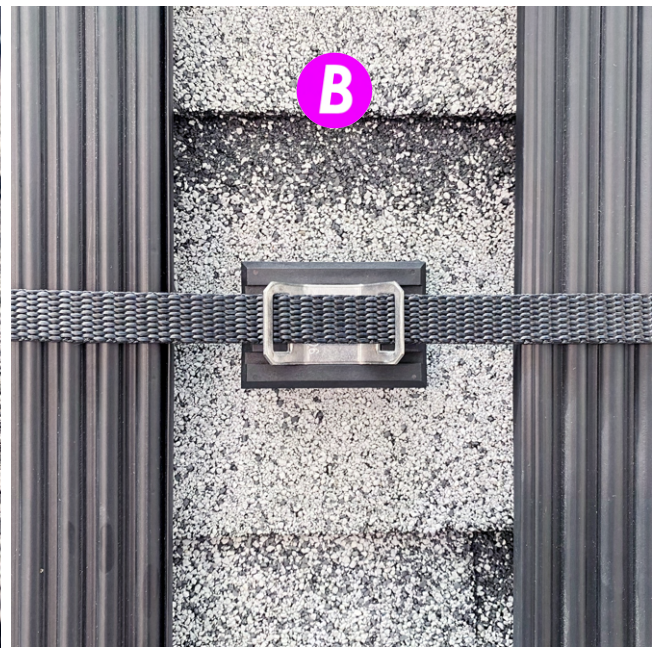


Figure 7.4



Figure 7.5

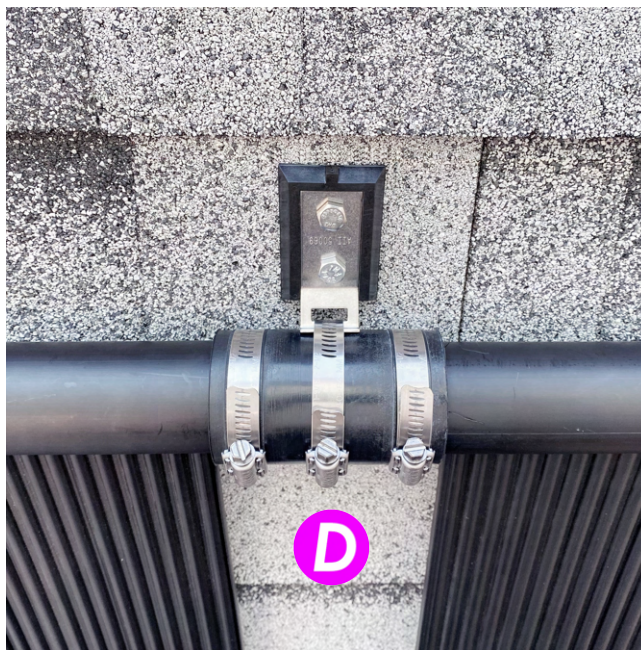


Figure 7.6

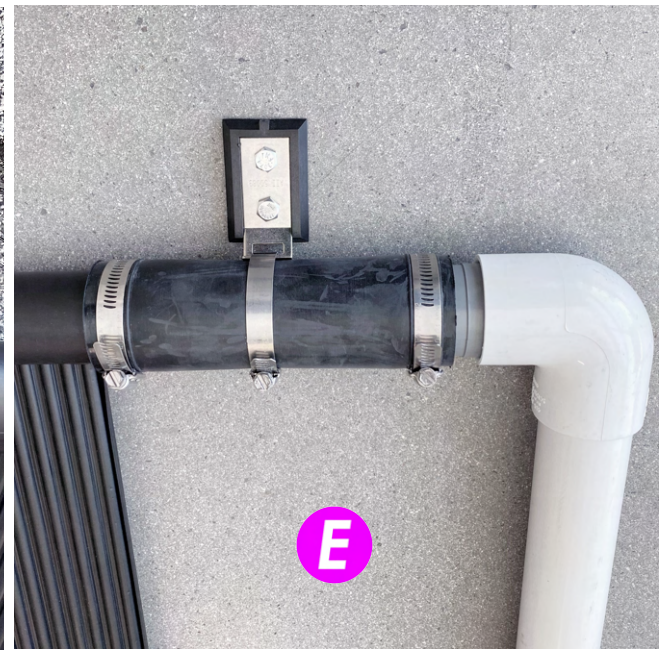


Figure 7.7

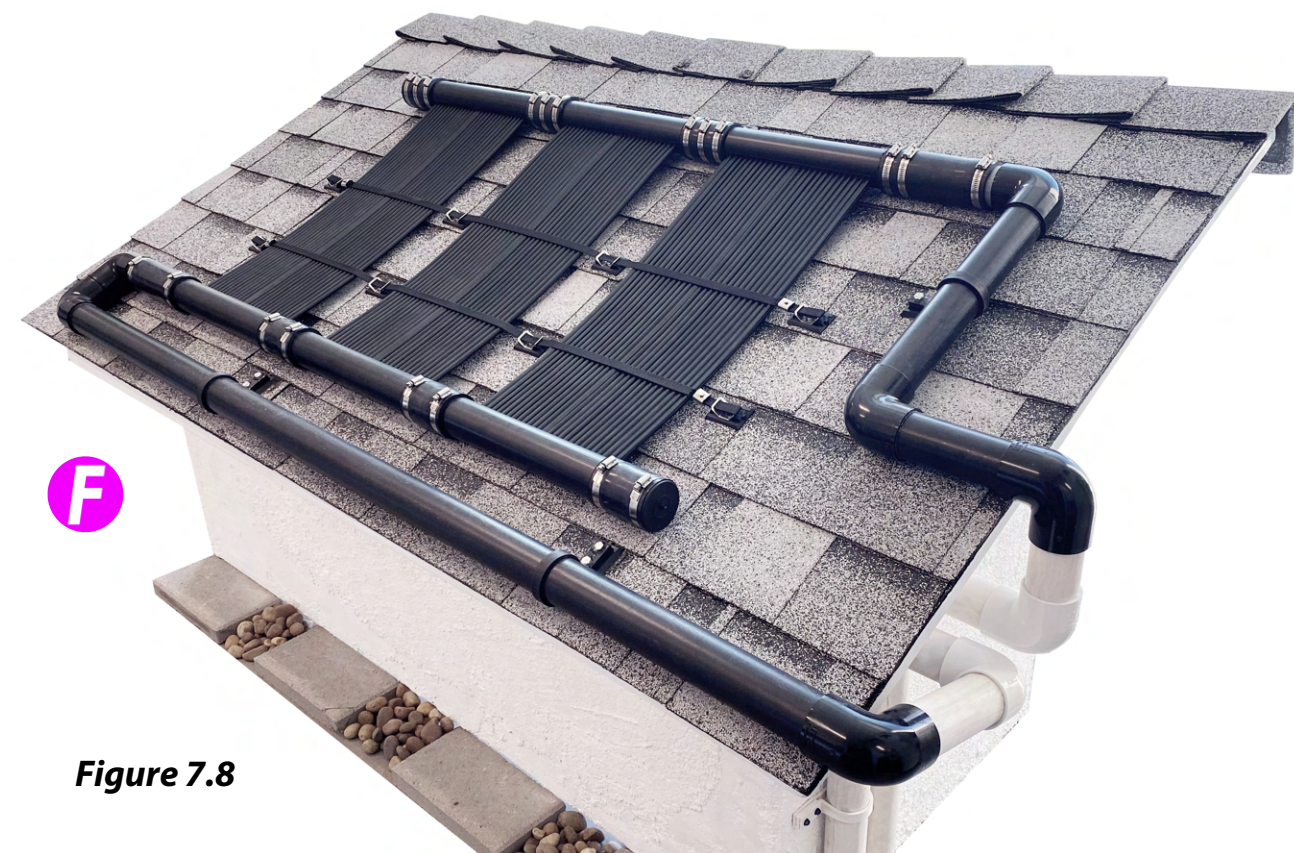


Figure 7.8



Figure 7.9

9. System Schematic

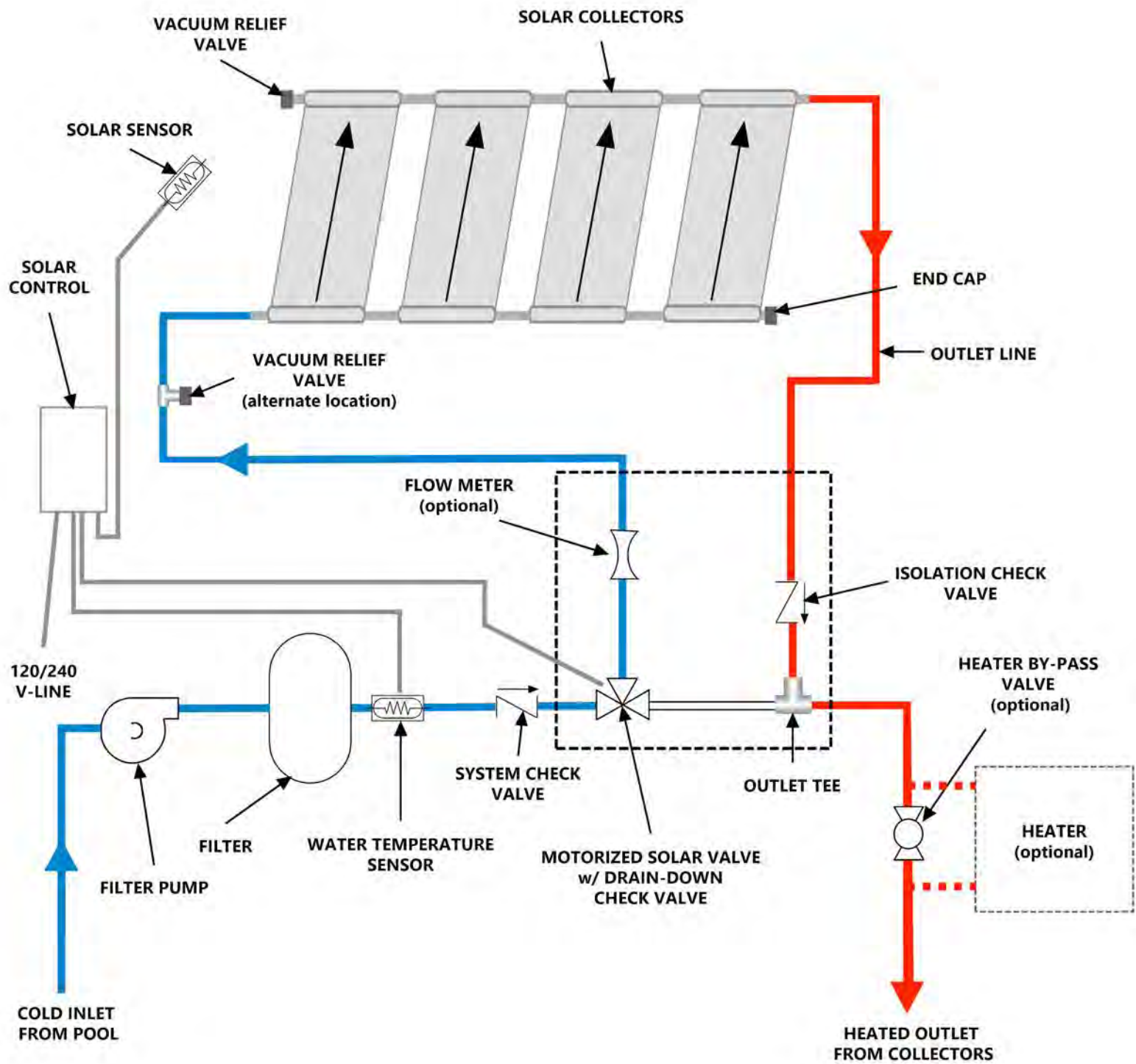
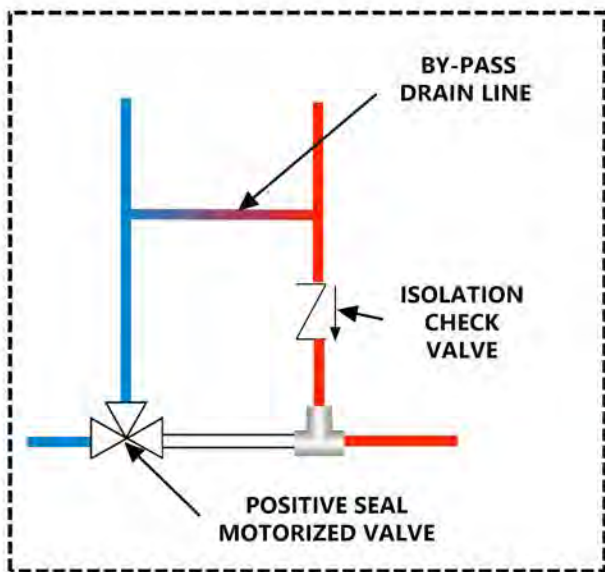
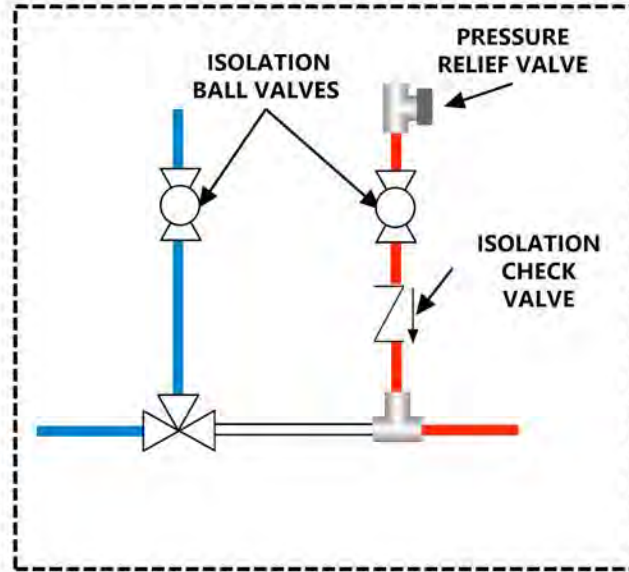


Figure 2A



POSITIVE SEAL w/ BY-PASS DRAIN LINE

Figure 2B



ISOLATION BALL VALVES w/ PRESSURE RELIEF

10. Mounting the Collectors

Collector Layout Overview & Planning for Obstructions



Overview

- When mounting the collectors, always make provisions for inlet connections at the bottom header and outlet connections at the top.
- The outlet headers must be pitched a vertical distance of at least 1/8" per foot (1cm per m) above the inlet headers to assure uniform flow and proper drainage to prevent freezing.
- Plan system location to allow at least 12" (30cm) on all sides of the row(s) of collectors for mounting brackets and piping.

Roof obstructions, if present, should now be taken into account to determine the exact collector location.

Collectors can be installed over or around different diameter roof vent pipes or other obstructions. After snapping the top chalk lines but before marking and pre-drilling for your outlet header brackets, refer to the following instructions:

For roof vents up to 2" (50mm) in diameter the collectors can be installed directly over these vents. Locate the seam in the panel nearest to where the vent pipe is to come through. Separate by pulling up on top plate, and pushing down on the lower plate. Should the vent pipe protrude near a sonic tack weld, it will have to be cut apart. Using a sharp utility knife, cut through the

weld while pulling the two plates apart. Lay the collector over the vent pipe, keeping the vent pipe at least 12 inches (30cm) away from a header. It will be easier to complete an installation by mounting this panel first and then working away from it.

For obstructions up to 7" (18cm) in diameter, the collectors can be positioned on either side of the vent. Two 7" (18cm) long *System Connector Hoses* (PN 60691-1 for 1½" or PN 60691-2 for 2") can be employed to couple the collectors together for vent pipes or other obstacles up to 7" (18cm) in diameter. Mark your 51" (128cm) centers wherever the outlet header brackets 'fall' on the upper chalk line.

For obstructions over 7" (18cm) in diameter, such as attic fans and skylights, position collectors on either side of the obstruction using a *Row Spacer Kit* (PN 12017-1 for 1½"; PN 12017-2 for 2") or *Header Spacers* (PN 30017-1, 2, 3, 4 for 1½"; 30159-1, 2, 3, 4).



Using various configurations of hoses and header spacers, this system avoids roof obstructions while maximizing the solar collector area. (Photo courtesy of Solar Living - Fair Lawn, NJ)

10. Mounting the Collectors, Cont.

Step 1: Install Outlet Header Hold-Down Bracket Assembly

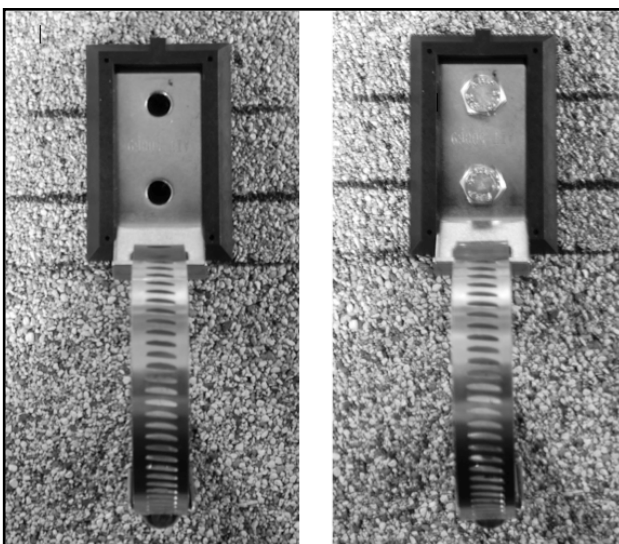


FIGURE 3

1. Determine the position of the last *Outlet Header Hold-Down Bracket Assembly* for the row of collectors, and mark this point on the roof. The collector outlet headers will be located 1" (25mm) below this mark.
2. Using this point, snap a chalk line to the opposite end of the row. **Slope this line down the roof toward the inlet a minimum of 1/8" per foot (1cm per m).**
3. Using a 1/8" (3mm) drill bit (for 1/4" (6mm) diameter screws), drill a pilot hole for the first *Outlet Header Hold-Down Bracket Assembly* on the first roof mark.
4. Measure up 1" (25mm) on center from the first pilot hole and drill a pilot hole for the second screw. Repeat this process all along the chalk line for the total number of collectors to be installed.
5. Inject a generous amount of high quality sealant into each hole and onto the surrounding roof surface. Attach the *Flashing Base & Outlet Header Hold-Down Bracket Assembly* to the roof as shown in **Figure 3**.

Step 2: Hold-Down Strap Bracket Locations

1. Locate the *Hold-Down Strap Bracket* (PN 50006) locations using Table 1 below. Measure "(A) Distance" down from the top *Outlet Header Bracket*, and snap a chalk line to the opposite end of the row. If using the *Optional Supplemental High Wind Area Collector Hold-down Kit*, use (A2) Distance from the outlet header for all three top straps
2. The "(B) Distance" can be measured after the collectors are installed, and is the same for all collector sizes: 16" (40cm) up from the outside of the inlet header.



Wait to install the Hold-Down Strap Brackets until after collectors are installed, so as not to damage the collectors when you are bringing them to the roof for installation.

TABLE 1 DISTANCE BETWEEN COLLECTOR HEADERS AND STRAPS

Collector Panel Size, Feet (m)	12 (3.7)	10 (3.0)	8 (2.4)	6 (1.8)	4 (1.2)
(A) Distance from outside of Outlet Header, Inches (cm)	60 (152)	48 (122)	36 (91)	24 (60)	-
(A2) Distance from outside of Outlet Header, Inches (cm)	32 (81)	28 (71)	20 (51)	-	-
(B) Distance from outside of Inlet Header, Inches (cm)	16 (40)	16 (40)	16 (40)	16 (40)	16 (40)

10. Mounting the Collectors, Cont.

Step 3: Install Connection Hoses on Collectors



***Make sure that the header with the serial number label is used for the outlet or top header.
The serial number label must face downwards towards the mounting surface.***

1. Bring the first collector to the roof and slip the proper hoses over both ends of the inlet and outlet headers on the last return collector.
2. Use *System Connector Hoses* (PN 60691-1 for 1½"; PN 60691-2 for 2"), at the system's feed and return points (outlet of the last collector and the inlet of the first collector). Use a *Pipe Adapter* (PN 30089-1 for 1½"; PN 30089-2 for 2") to connect the System Connector Hoses to the system's PVC piping.
3. Place a hose clamp between the two indicator ridges on the hose, in order to center it over the sealing groove in the header. This clamp must face up so as to be accessible for tightening and not rub against the mounting surface.
4. Make sure you securely tighten each clamp with a nut driver. If a nut driver is not available, a 'hex' wrench or screwdriver will suffice.

The hose clamps must be located between the two indicator ridges on the hose.

Do not tighten more than 35-40 inch-pounds!

Step 4: Secure Outlet Header Bracket to Collector Connector Hoses

1. Position the collector on the roof so that the center of the outlet *Connector Hoses* are directly beneath the secured *Outlet Header Hold-Down Brackets*.
2. Open the clamp that is part of the outlet header bracket, insert connection hose and **lightly tighten** the clamp around the hose.
3. Loosely place another clamp over the open end of the hose before installing the next collector in the array. Refer to **Figure 4**.
4. Continue to install all the collectors in the array, coupling them side to side.

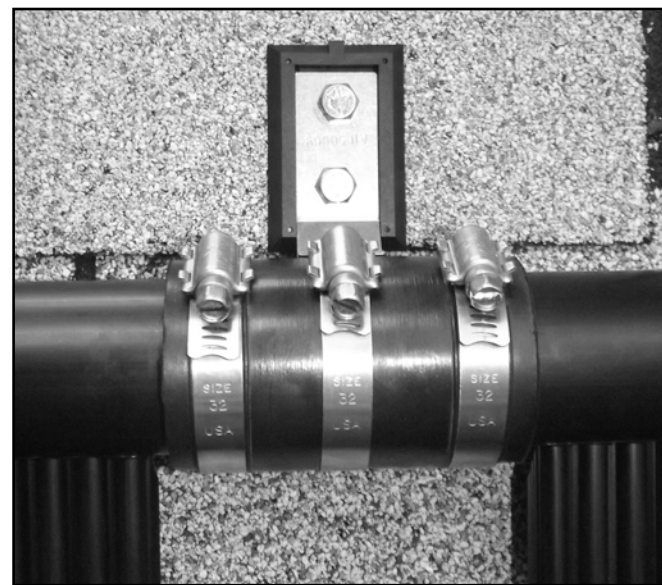


FIGURE 4



Supplemental Mounting Hardware

If using the supplemental *Aluminum Header Clamp Assembly*, (PN 10117-1 for 1½"; PN 10117-2 for 2"), or *GFPP Outlet Header Clamp Assembly*, (PN 10121) install after both the *Outlet Header Hold-Down Brackets* and collectors have been installed.

10. Mounting the Collectors, Cont.

Step 5: Install Hold-Down Strap Brackets & Stainless Steel Strap

1. At the lower chalk line previously snapped on the roof, mark locations for the first row of *Hold-Down Strap Brackets* 2" (5cm) away from the first and last collectors and centered between each collector.
2. Drill a pilot hole and apply sealant, then mount the *Flashing Base and Hold-Down Strap Bracket*. Slip a *Strap Hold-Down Clamp* (PN 10011) over the end of the strap prior to pulling it through (refer to **Figure 5**).
3. Loop approx. 2" of strap through the *Outlet Header Bracket* and then back through the *Hold-Down Strap Clamp*. Slide the *Hold-Down Strap Clamp* towards the *Hold-Down Strap Bracket*. The screw should be tightened securely, but not over-tightened to the point where the clamp is distorted (refer to **Figure 5**).



FIGURE 5



For longer arrays it will be easier to start the strap in the middle collectors and work your way out.

4. Moving across the row, drill pilot holes at each marked point between collectors, apply sealant, and attached all *Flashing Bases and Hold-Down Strap Brackets* to the roof.
5. Bring the remaining strap end across the collector face, passing through both slots of the *Hold-down Strap Brackets* between collectors. Pull strap taut against the face of the collectors. Repeat strap termination at opposite end (refer to **Figure 6**).
6. Mark, drill, and mount the remaining *Hold-Down Strap(s)* by repeating the above steps at the distance(s) specified in **Table 1** in Step 2: Hold-Down Strap Bracket Locations.

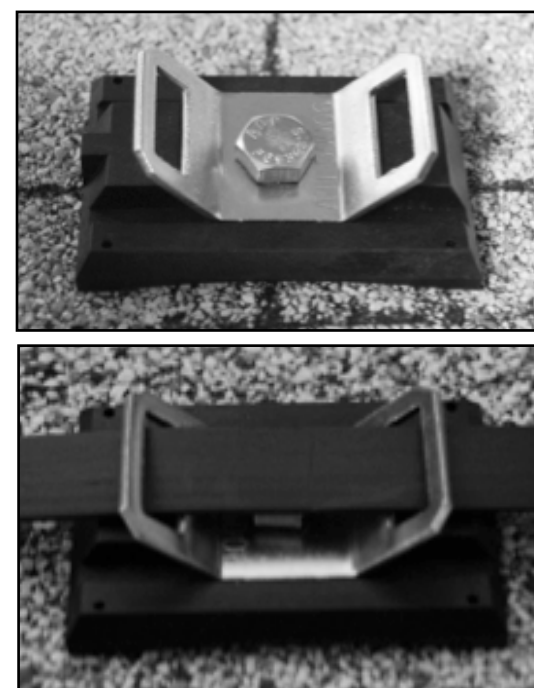


FIGURE 6

10. Mounting the Collectors, Cont.

Step 6: Install Vacuum Relief Valve & End Cap



1. Install the *Vacuum Relief Valve* (PN 10003-1 for 1 !"; PN 10003-2 for 2") in the outlet header of each row.

This will be located at the opposite end of the header that is connected to the collector return line.



2. Install an *End Cap* (PN 30061-1 for 1 !"; PN 30061-2 for 2") in the inlet header of each row, opposite the end that is connected to the collector inlet pipe.



The hose clamps must be located between the two indicator ridges on the hose. Do not tighten more than 35-40 inch-pounds!

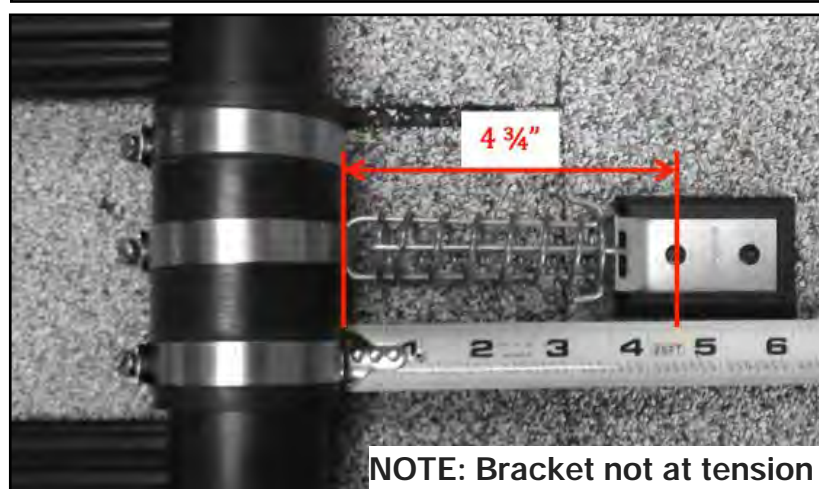
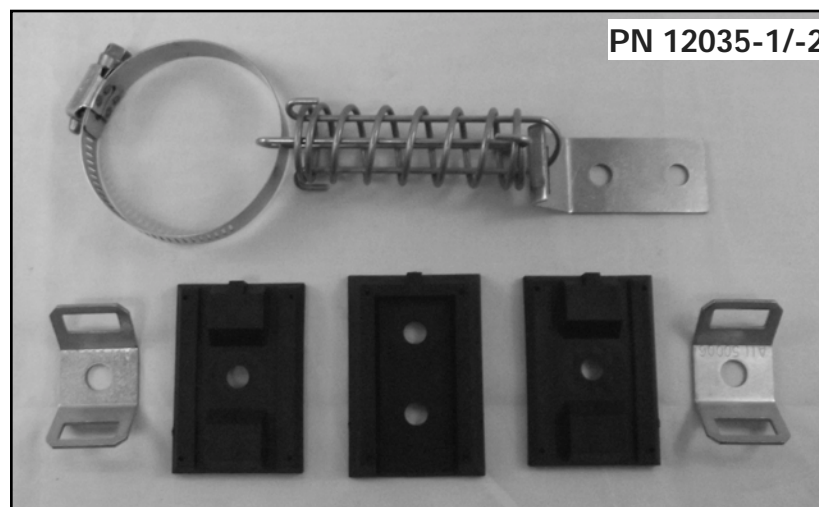
Installation in High Wind Areas

In regions where high winds are prevalent, use the *Supplemental High Wind Area Collector Installation Kit*, (PN 12035-1 for 1 !"; PN 12035-2 for 2") and *Supplemental Row/System Kit* (PN 12143-1 for 1 !"; PN 12143-2 for 2") in addition to the standard installation kits (**refer to Figure 7**). The included bracket assembly's spring-tension design allows for collector expansion and contraction, while providing an additional mounting point. *Supplemental High Wind Kits* also contain the required hardware for two additional *Hold-down Straps*. Use **Table 2** below to determine proper spring-tension length, based on collector size and average air temperature.

FIGURE 7

TABLE 2 SPRING TENSION LENGTH

TEMP	8'	10'	12'
0	5"		
15	5"	5"	
30	4- 3/4"	5"	
45		4- 3/4"	4- 3/4"
60			
77	4- 3/4"	4- 3/4"	
85	4- 1/2"	4- 3/4"	
100		4- 3/4"	
115		4- 3/4"	
130	4- 1/2"	4- 1/2"	4- 1/2"
145	4- 3/8"	4- 1/2"	
160		4- 3/8"	4- 3/8"



11. System Piping

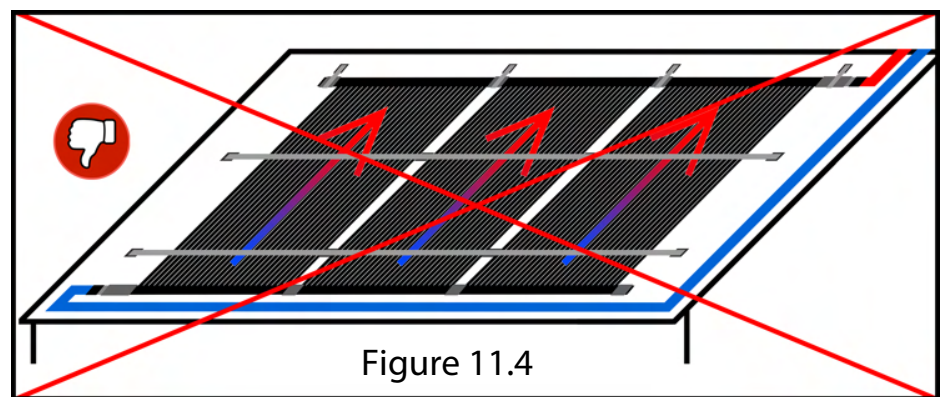
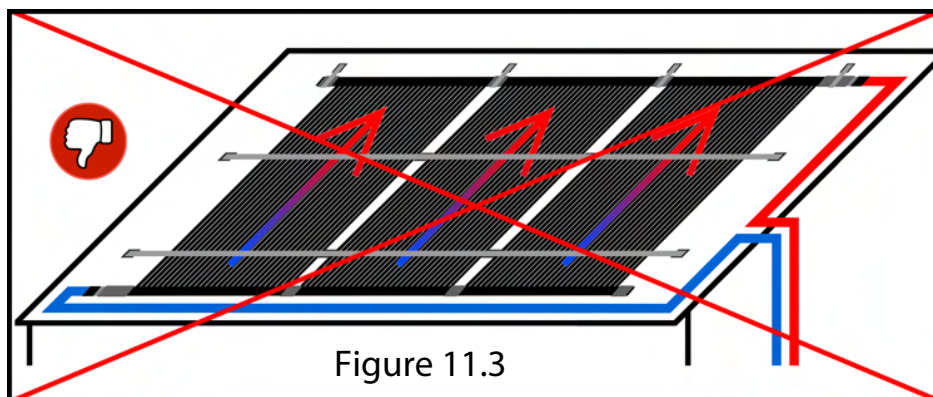
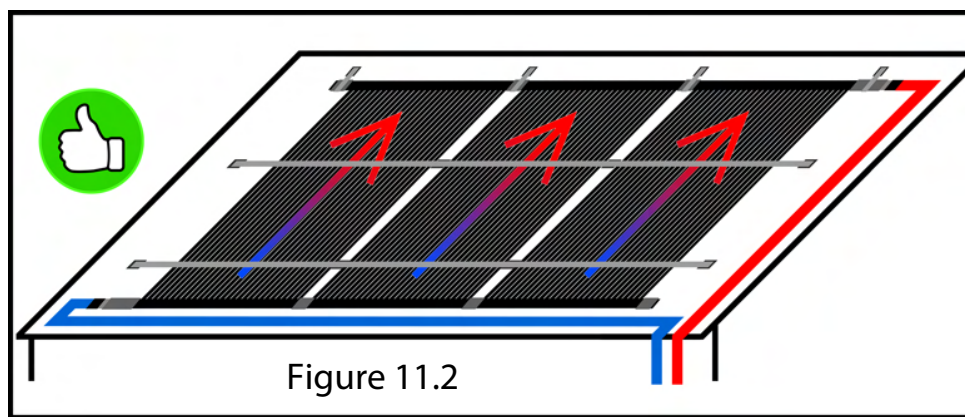
Overview

- Piping to and from the collectors should always be done with Schedule 40 PVC pipe and fittings. **DO NOT** use ABS pipe.
- Whenever there is more than 50 gpm required flow rate to the collectors or more than 100' of piping used in a system, install 2" piping to and from the panels. See Figure 10.1 below for Pipe Size Based on Flow Rate.

Figure 11.1

Flow Rate (GPM)	Minimum Pipe Size @ 7ft/s Velocity	Minimum Flow To Purge Air			Pipe Support Spacing Horizontal PVC Pipe Runs
		Flow Up	Horizontal Flow	Flow Down	
50	1.5" ID	11	22	33	5 ft
80	2" ID	20	39	59	5 ft
115	2.5" ID	31	61	92	5.5 ft

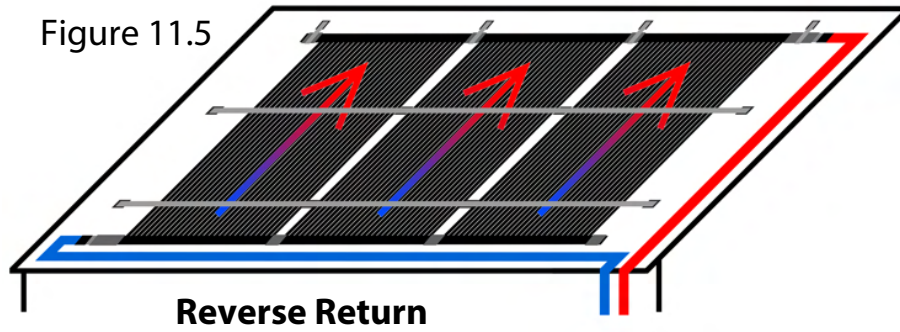
- The plumbing design must also be done in a manner that allows all water to gravity drain from the panels back through the solar feed inlet pipe when the pump is off. Figures 11.2, 11.3 and 11.4 below address some common do's and don'ts of gravity drainage. If the piping can't allow gravity drainage, manual drains must be installed. If the panels are installed flat, the only method to drain all water from them will be to remove the end caps and physically lift one header higher than the other to ensure all water is drained. Compressed air **WILL NOT** remove all water from the panels. **Freeze damage can occur starting at 40 degrees Fahrenheit**, so there can be no water in the panels when these weather conditions occur.



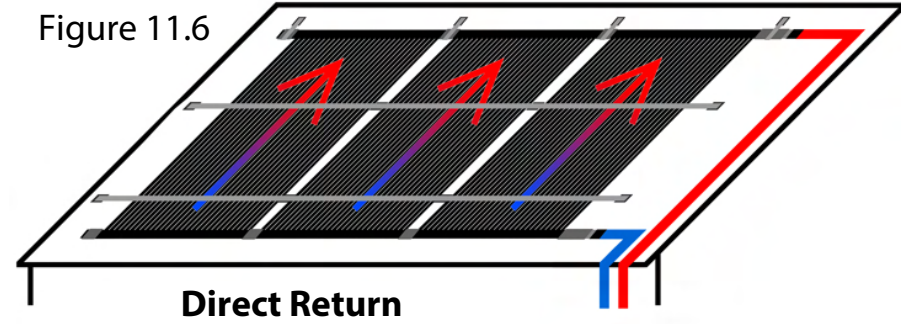
- If a gas/electric heater or heat pump is installed, it should be located after the solar return line.
- Although PVC pipe is generally white, black is also available but may be difficult to find locally. If black pipe is desired for aesthetics, white pipe can always be painted black. Before painting, the PVC pipe must be wiped with cleaner to remove the glossy surface coating. This will ensure that the paint will not flake off prematurely.
- Use a PVC cutter or a PVC wide-blade saw (not a hacksaw) for cutting pipe. It is important to use both a high quality cleaner/primer and solvent/medium when gluing PVC joints. Use a cloth when either gluing or painting to keep the installation clean.
- Piping should be supported at intervals based on pipe size as referenced in Figure 11.1. Solar Pool Supply Pipe Support Brackets made from high-strength glass-reinforced polypropylene are available separately:
 - Black: #30272-1 for 1.5" pipe or 30272-2 for 2" pipe
 - White #30284-1 for 1.5" pipe or 30287-2 for 2" pipe
 - These also utilize the flashing base (#30340-1) creating an optimal sealed mount.

11. System Piping, Cont.

System Feed Inlet And Return Outlet Piping Configurations



- In a traditional reverse return piping configuration, the feed and return points of each row of panels will be diagonally opposite each other as shown in Figure 11.5 above.
- The Vacuum Relief Valve and End Cap of each row will also be diagonally opposite each other.
- This reverse return configuration is highly recommended and should be used any time space allows. This configuration ensures balanced flow across the entire row of panels maximizing heating performance.



- This direct return configuration should only be used as a last resort if space is limited. This configuration, as detailed in Figure 11.6 above, positions the feed and return points on the same side of a row of panels.
- Though this configuration reduces the total pipe required, and is often more aesthetically-pleasing, it will produce unbalanced flow and reduced performance.
- See Figure 11.8 below for the maximum number of panels that can be installed in a direct return configuration at various flow rates.

Flow Rate

- In order to achieve optimum performance from the panels, the reverse return configuration should be performed following the flow rates and number of panels referenced in Figure 11.7 below.

COLLECTOR SIZE	4' x 8'	4' x 10'	4' x 12'
STANDARD FLOW RATE PER COLLECTOR, GPM	3.25	4.00	5.00
MAXIMUM FLOW RATE PER COLLECTOR, GPM	2.50	2.50	3.00
MAXIMUM # OF COLLECTORS PER ROW, 1.5" / 2"	12 / 14	12 / 12	10 / 12
MAXIMUM SQUARE FOOTAGE PER ARRAY, 1.5" / 2"	480 / 576	450 / 576	480 / 576

Figure 11.7

- The direct return configuration should only be used as a last resort if space is limited. Reference Figure 11.8 below for flow rates and maximum number of panels to be used per row.

COLLECTOR SIZE	8'		10'		12'	
	1.5"	2"	1.5"	2"	1.5"	2"
MINIMUM FLOW RATE (0.06 GPM/SQ FT)	-	-	-	-	-	-
STANDARD FLOW RATE (0.10 GPM/SQ FT)	6	6	6	6	6	6
RECOMMENDED FLOW RATE (0.15 GPM/SQ FT)	7	8	7	8	7	7
MAXIMUM FLOW RATE (10 GPM/PER COLLECTOR)	8	12	8	10	8	8

Figure 11.8

Figure 11.9

Pressure Drop	0.05 PSI @ 2.5 GPM	0.13 PSI @ 5.0 GPM	0.39 PSI @ 10.0 GPM
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11. System Piping, Cont.

Flow Rate

In order to achieve optimum performance from Solar Pool Supply collectors, the recommended flow rates and number of collectors per row in **Table 5** should be followed.

When the system is running, all the collectors should feel uniformly cool to the touch, and there should be no residual air left in the pool return lines. If collectors feel warm or hot to the touch, or air bubbles in the return line persist, chances are that flow through the collectors is inadequate or the system is not properly balanced (refer to the section concerning the **Vacuum Relief Valve Test** on page 14.



- A flow meter can be installed in the collector feed line to check the flow rate. If the flow rates are within the limits as shown above in **Table 5**, the system may not be properly balanced, especially in systems with multiple banks of collectors.

TABLE 5: FLOW RATES

COLLECTOR SIZE, FEET:	4 X 12	4 X 10	4 X 8
STANDARD FLOW RATE PER COLLECTOR, GPM (LPM)	5.0 (18.9)	4.0 (15.1)	3.25 (12.5)
MINIMUM FLOW RATE PER COLLECTOR, GPM (LPM)	3.0 (11.4)	2.5 (9.5)	2.5 (9.5)
MAXIMUM # COLLECTORS PER ROW, 1 !"; 2"	10; 12	12; 12	12; 14
MAXIMUM SQUARE FOOTAGE PER ARRAY, 1 !"; 2"	480; 576	480; 576	480; 576

PRESSURE DROP (PSI @ GPM): # 1 !" - 0.05 @ 2.5; 0.13 @ 5.0; 0.39 @ 10.0
 # # # # # # 2" - 0.05 @ 2.5; 0.20 @ 5.0; 0.60 @ 10.0



If the flow rate is below the minimum as shown in the table above, then the pool pump size, pump speed, or pipe size should be increased, or a booster pump installed in some cases.

If the flow rate is excessive (more than 10 gpm / 37.9 Lpm) collector), or if the system pressure is greater than 30 psi, a By-pass Check-Valve (PN 60717) should be installed between the collector feed and return lines above the 3-way valve to prevent problems with the collectors and connection hoses.

If the system has been installed according to this manual, optimum performance conditions will now exist. Systems with rows of collectors of unequal size, but fitted with balancing valves, may now be adjusted.

Open all balancing valves completely and let the system run for several minutes. Any row that is warmer to the touch than others is currently receiving less flow than it should for optimum performance. Throttle the valve(s) of the other (cooler) row(s) step-by-step, each time waiting for a few minutes, and check the temperature. Once all rows feel uniformly cool, the system is balanced and operates at optimum performance. Should unexpected problems be encountered, the flow rate must be checked out more thoroughly.

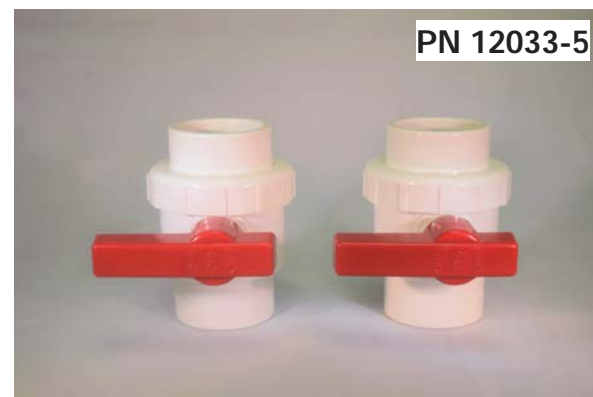
11. System Piping, Cont.

Optional Isolation Valves

If the system has been installed in accordance with this manual, and a Solar Valve with Drain-down Check Valve (see Figure 2B on page 4), or a Positive Seal Valve with a By-pass Drain Line (see Figure 2A on page 4) has been used, the solar collectors will be isolated and able to drain each time the solar system cycles off and the filtration pump shuts off.

As an added measure of safety, two isolation ball valves may be installed in the collector piping feed and return lines so the pool's filtration system may be operated during freezing weather or for service.

Both valves, available in the *Supplemental System Isolation Kit (PN 12033-5)* are made to accept either 1 1/2" pipe or a 2" coupling. Make sure that the ball valves are located close to the diverter valve and outlet tee respectively.



To manually isolate the solar collectors with the Supplemental System Isolation Kit, first turn the filtration pump off and allow 30 minutes for the water to drain out of the collectors and system piping. Then place the solar control into the "Off" or "Pool", or "Solar Disabled" position and turn both isolation valves 90 degrees into the closed position. The filtration pump may then be restarted. When returning the solar collectors to service, first open up the isolation valves and then return the solar control to "Auto", or "Solar Enabled" position.



If the Supplemental System Isolation Kit is used, it is also recommended to install a 30 psi pressure relief valve in the system piping between the solar collectors and the isolation ball valves. If the system is installed on a commercial or public pool, local codes may require use of the Supplemental System Isolation Kit and pressure relief valve.

12. Solar Control Options

Control Types

Automatic Temperature Control: The performance of a solar pool heater can be maximized with the use of a solar control and motorized diverter valve. When solar energy is available, the solar control activates the motorized valve, sending water through the collectors for heating (or nocturnal cooling). When the pool reaches the set temperature, or there is insufficient solar energy available, the motorized diverter valve will turn to bypass the solar system. Refer to the manufacturer's instructions included with the solar control you use.

Manual Temperature Control: Some systems employ a manually operated valve to divert the flow of water to the solar system, though this may reduce the overall heating capacity of the system. Pool water continuously flows through the solar system when the filtration pump is on but can be diverted manually if the pool becomes too warm or during extended periods of insufficient solar energy. A manual temperature control system consists of a manually operated diverter valve in place of the motorized diverter valve.

13. Checking for Operations

System Startup, Testing, and Troubleshooting

Each time the solar system cycles on, there are a few things to watch for:

- ✓ Air will initially be purged into the pool. This may last several minutes.
- ✓ The filter pressure will increase slightly and remain elevated when pool water is flowing through the solar system.
- ✓ When the system is running, all the collectors should feel uniformly cool to the touch.

Vacuum Relief Valve Test: When the solar system is first turned on, air in the collectors will be expelled into the pool and bubbles will appear. The appearance of bubbles in the pool should stop after a few minutes.

- If, after a few minutes, bubbles continue to be discharged from pool returns, remove the *Vacuum Relief Valve(s)* and replace it with an *End Cap*. If the bubbles discontinue, the issue may be the *Vacuum Relief Valve* location.
- If bubbles continue, reverse the *End Cap* and the *Vacuum Relief Valve* on the collector array to see if this stops the bubbles in the return lines.
- If bubbles continue after reversing the *VRV* and *End Cap*, relocate the *VRV* to a position in the inlet piping at a height of approximately 3/4 of the elevation of the collectors above the pool. **Refer to Figure 2.**

Flow Rate Test Methods:

1. **Flowmeter:** The preferred system test method is flow rate. This is also the easiest and quickest method. To check flow rate, install a flow meter in the inlet line to the collectors (follow installation instructions provided with the flowmeter).
2. **Touch Method:** With the system running and the sun shining, all collectors of the system should be uniformly cool to the touch, and the system will be operating at optimum performance.
3. **Temperature Rise Method:** An alternate method to test adequate flow is by measuring the temperature rise of pool water through the system. **It is important that the temperature rise through the collectors be kept as low as possible in order to deliver the maximum amount of heat to the pool.** Use two accurate thermometers - one in the pool water or filtration piping prior to the collectors, and one in the system outlet piping - to measure the temperature rise from solar.
 - Before installing, immerse both thermometers in the pool water for several minutes to compare temperature readings. If they are not identical, make a notation of the difference and add or subtract (as appropriate) this difference to or from the reading taken while you are testing.
 - Turn the pump on and move the flow switch to the “Manual ON” position to divert pool water through the collectors. After at least fifteen minutes of flow to collectors, compare the temperature of the pool water with the water flowing through the outlet piping.



On an average sunny day, with the air temperature approximately 70°F (21°C) the water leaving the collectors should be 1° to 7°F (1° to 4°C) higher than that in the pool. If the water rise is greater than this, insufficient water is flowing through the collectors. This may be caused by a clogged filter, undersized piping, too many elbows in the piping or an inadequate pump.

14. Maintenance

Pool Service & Maintenance

Backwashing & Adding DE: It is advisable to bypass the solar collectors when either backwashing your filter or adding Diatomaceous Earth (DE). This prevents the possibility of any DE or other debris from passing through the solar system as well as any other pool equipment downstream of the filter. When the backwashing cycle and/or the adding of DE is complete, run the filtration system for 10-15 minutes before returning your solar heating system to operation.

Automatic Pool Cleaning Systems: If you have an automatic pool cleaning system with its own pump, there may be several precautions that you need to take depending on what type of system you have. These precautions prevent the air that is initially purged from the solar system from possibly damaging pool cleaning equipment during the turning on cycle of your solar system.

- **Manual Temperature Control:** Do not start the flow of water through the solar collectors while the pool cleaning pump is running. Allow the air to be purged from the system and then activate your pool cleaning system.
- **Automatic Temperature Control:** If your solar control is not equipped with a timed pool cleaner delay cycle, it will be necessary to run your pool cleaner in the early morning and turn it off before your solar system comes on; or turn it on in the late morning, well after your solar system normally cycles on. If you manually vacuum your pool, bypassing the solar collectors at this time will provide you with full power for better vacuuming performance.

Cold Weather Operation

In some areas, pool owners operate their pools throughout the winter although light freezing conditions may occur. When solar heaters are operated under these conditions, anti-freeze precautions should be taken, in order to protect collectors and components against unusual or severe freezing conditions. One of the following three procedures should be followed when freezing weather is imminent:

1. If the system has been installed in accordance with this manual, and a Solar Valve with Drain-down Check Valve (Figure 2B) or a Positive Seal Valve with a By-pass Drain Line (Figure 2A) has been used, the solar collectors will be isolated and able to drain each time the solar system cycles off and the filtration pump shuts off. Turn the filtration pump off and allow 30 minutes for the water to drain out of the collectors and system piping. The system will return to normal operation automatically after freezing conditions have passed.
2. If isolation valves have been installed, turn the filter pump off and allow 30 minutes for the water to drain out of the solar collectors and system piping. Close isolation valve(s) if applicable. Switch the solar control to "OFF" or "Solar Disabled". The pool filtering system may then be turned back on. When freezing conditions have passed, open isolation valves and switch the solar control to "AUTO" or "Solar Enabled".
3. If the system cannot be drained and isolated, the accepted procedure for avoiding freezing of the pool piping and filtration system has been to continuously circulate the water. Switch the solar control to the "Manual ON" position so that water circulates through the collectors. When freezing conditions have passed, switch the solar control to "AUTO" or "Solar Enabled". **This method is not recommended where temperatures may drop severely.**

Winterization Procedures

During normal operation, when the diverter valve is in the "bypass collector" position, all water in the collectors should drain back through the Solar Valve with Drain-down Check Valve or a Positive Seal Valve with a By-pass Drain Line when the filter pump shuts off. If there are isolation ball valves in the collector piping feed and return lines, they should only be closed after the collectors have drained fully. Provided collectors are drained, there are no further requirements for winterizing the solar collectors. The pool piping should be winterized as per your normal practice.

15. Troubleshooting Quick Guide

Performance

Problem:	Check:	Solution:
Weather	<ul style="list-style-type: none"> Cooler / wetter than usual? 	<ul style="list-style-type: none"> Use a cover or blanket
Low Flow	<ul style="list-style-type: none"> Check for high filter pressure 	<ul style="list-style-type: none"> Clean and/or backwash filter
Solar Control	<ul style="list-style-type: none"> Power-on indicator light Manual operation Solar & pool sensors w/ Ohm meter Control differential function/setting 	<ul style="list-style-type: none"> Switch / circuit breaker Control / valve / valve wiring issue Replace sensors Adjust temperature differential setting
Unbalanced Flow	<ul style="list-style-type: none"> Feel collector temperature w/ hand or use infrared thermometer 	<ul style="list-style-type: none"> Plumb to balance

Air in Lines

Problem:	Check:	Solution:
Filter	<ul style="list-style-type: none"> Check for high filter pressure 	<ul style="list-style-type: none"> Clean and/or backwash filter.
Pump Strainer Basket	<ul style="list-style-type: none"> Observe basket for air Other "suction side" leaks 	<ul style="list-style-type: none"> Tighten / replace o-ring or gasket Repair leak
Partial Flow	<ul style="list-style-type: none"> Check diverter valve Verify flow rate (page 11) 	<ul style="list-style-type: none"> Adjust limit switches (motorized) Increase pump size / speed
Vacuum Relief Valve	<ul style="list-style-type: none"> VRV sucking air Listen for "chirping" noise 	<ul style="list-style-type: none"> Switch end cap & VRV locations Relocate to collector feed line Use "Heavy Duty" VRV (PN 10127-1/-2)
Return-line Flow Velocity	<ul style="list-style-type: none"> Verify flow velocity > 6 ft/sec to purge air from piping 	<ul style="list-style-type: none"> Decrease pipe size Increase flow rate

16. Repair Procedures

Repair Method (A) - Leak In Body Of Panel

- If a leak occurs in the body of the panel 2" or more away from either header, follow the below repair procedures. If a leak is occurring at the weld where the tubes join the header, follow Repair Method (B) on Page #27.

Figure 16.1



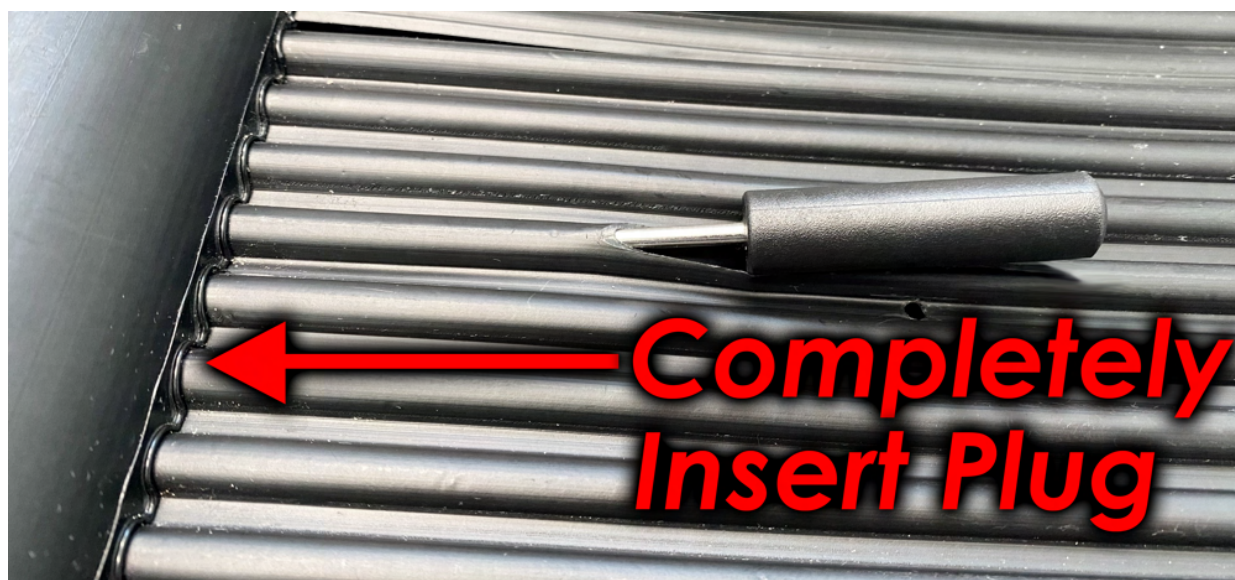
- Identify which tube is leaking as you will be cutting and plugging this tube only at both top and bottom locations.
- Measure 2" away from the header and mark this location on the leaking tube. Utilizing the repair cutting tool handle with blade installed, carefully cut away a 1.5" long section out of this tube pushing away from the header starting at the 2" mark you just made. Be careful not to cut the adjacent tubes. Remove cut out tube section. Reference Figure 16.1 above.

Figure 16.2



- Wet the cut out area of the tube and the rubber plug with water. Don't use any other lubricant. Insert the insertion tool tip into the plug. Pushing the plug very slowly into the cut out section towards the header, completely insert the plug. Performing a quick twisting motion backwards, remove the insertion tool. Reference Figure 16.2 above and 16.3 below. Repeat these same procedures on the opposite end of the panel on the same leaking tube.

Figure 16.3



16. Repair Procedures, Cont

Repair Method (B) - Leak At Weld Junction Of Tube And Header

- If a leak occurs at the weld where the tube and header are joined, follow the below repair procedure.
- Using a sharp utility knife, very carefully cut away an approximate 1" section of the tube that is leaking at both top and bottom headers.
- Drive a #10-#12 stainless steel sheet metal screw into the metering hole in the header. The screw must be 1/2" to 3/4" long.
- **DON'T OVERTIGHTEN!** If the screw strips out, or if the repair leaks, us a larger diameter screw.

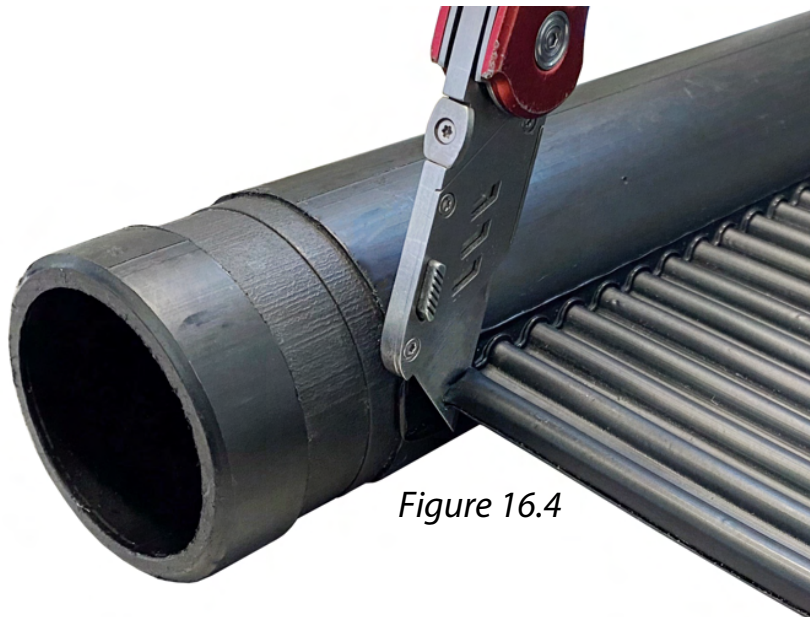


Figure 16.4

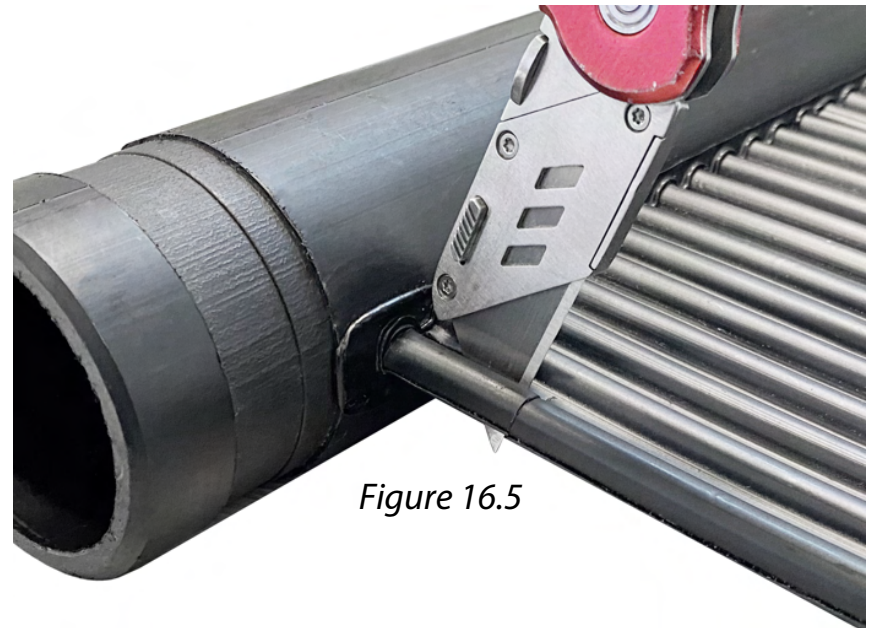


Figure 16.5



Figure 16.6

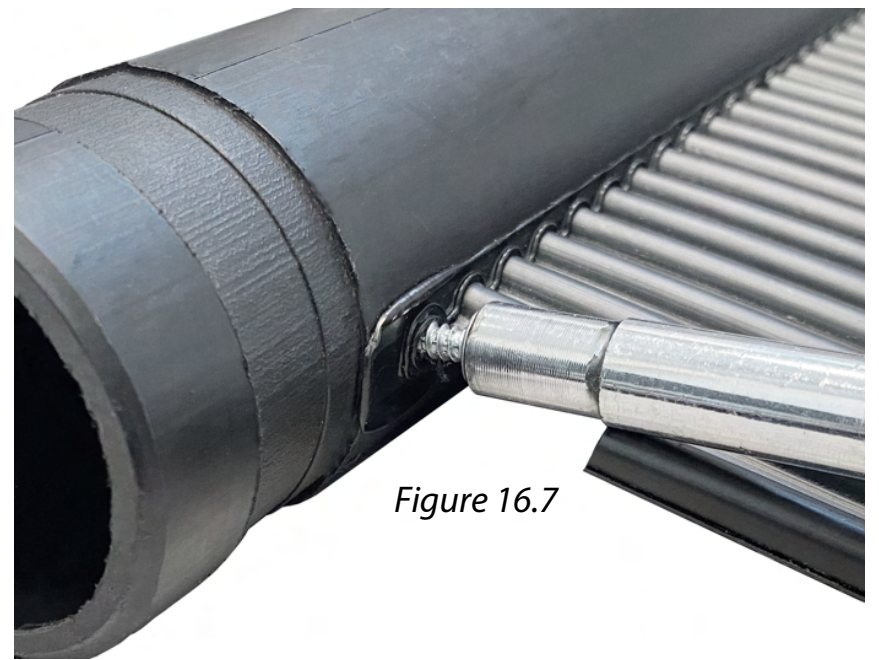


Figure 16.7

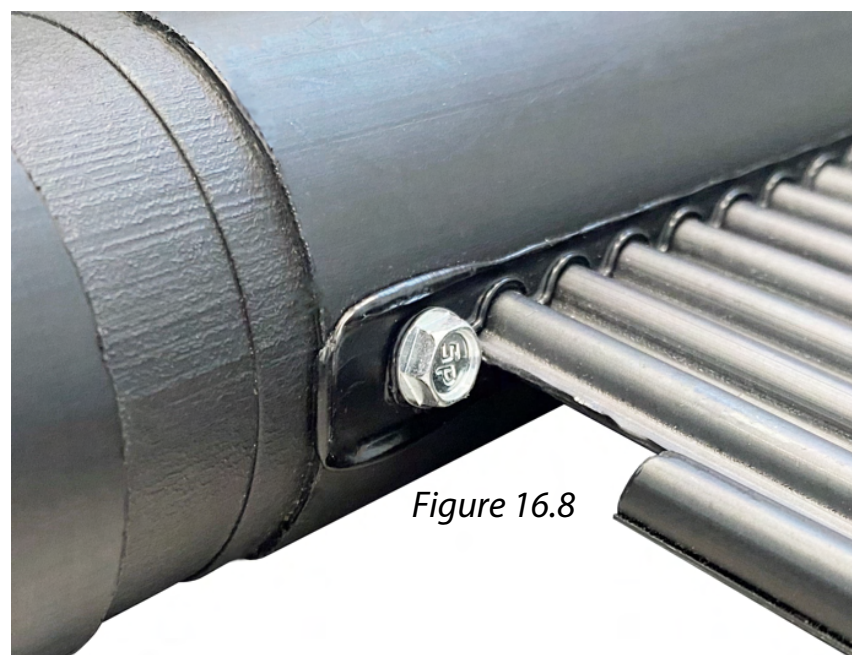


Figure 16.8



FIVE (5) YEAR LIMITED / TEN (10) YEAR LIMITED WARRANTY

WARRANTY:

This is a ten (10) year limited warranty issued by Solar Pool Supply, hereinafter referred to as "SPS", covering all SwimEasy solar collectors purchased for use on swimming pools, spas or hot tubs, and installed in North America. This warranty is non-transferrable and extends only to the first original buyer on whose property the equipment is originally installed.

FIVE (5) YEAR LIMITED PARTS WARRANTY ON THE SOLAR COLLECTOR:

SPS warrants that its SwimEasy unglazed solar collector will be free from defects in materials and workmanship, will withstand the effects of freezing weather and will not fail from corrosion or scale deposits in the walls of its water passages. If a defect becomes evident within five (5) years from the original purchase date, SPS will provide a repair method, or at its option replace the defective solar collector with a new solar collector of at least the same quality within a reasonable time and without charge for parts. SPS will be responsible only for the cost of the replacement solar collector. SPS WILL NOT PAY OR BE RESPONSIBLE FOR ANY COSTS ASSOCIATED WITH INSTALLATION, REMOVAL, TRANSPORTATION (SHIPPING), ANY LABOR COSTS OR ANY OTHER COSTS RESULTING FROM THE FAILURE OF THE COLLECTORS OPERATION.

TEN (10) YEAR LIMITED PARTS WARRANTY ON THE SOLAR COLLECTOR:

At the conclusion of the fifth year from the original purchase date, SPS will grant a limited warranty to extend an additional five years. If any warranty claim arises after the fifth year from the original purchase date until ten years from the original purchase date, SPS will provide a repair method or at its option replace any solar collector within a reasonable time which has been found to be defective, solely in material and workmanship. In the event SPS opts to replace any solar collector, the purchaser shall pay to SPS fifty percent (50%) of the published list price of the solar collector in effect at the time the defect is discovered. The replacement solar collector will be of at least the same quality as the defective solar collector. SPS WILL NOT PAY OR BE RESPONSIBLE FOR ANY COSTS ASSOCIATED WITH INSTALLATION, REMOVAL, TRANSPORTATION (SHIPPING), ANY LABOR COSTS OR ANY OTHER COSTS RESULTING FROM THE FAILURE OF THE COLLECTORS OPERATION. The limited warranty extends only to the first original buyer on whose property the equipment is originally installed.

EXCLUSIONS & LIABILITY LIMITATIONS:

When a solar collector is replaced, any replacement item becomes the original Purchaser's property and the defective solar collector becomes the property of SPS. It is the responsibility of the Purchaser to return the defective solar collector to SPS and pay the cost of transportation (shipping). SPS is not required to release any replacement solar collectors until the defective solar collector has been returned and has been found to be defective. SPS shall be released from all obligations under its warranty in the event (a) that the solar collector has been subject to negligence, misuse, accident, other external causes, improper installation, or if repairs or modifications were made by service personnel without proper certification; (b) that the solar collector was not installed and/or operated in accordance with all local fire codes and plumbing codes, ordinances and regulations; (c) that the solar collector has been used in any instance other than its intended purpose or has not been properly maintained; (d) that the solar collector has been damaged by extraordinary or abnormal weather conditions, person or act of God; (e) that the solar collector's serial number label has been altered, effaced or removed.

EXCEPT AS EXPRESSLY PROVIDED HEREIN, SPS DOES NOT MAKE AND HEREBY DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTIES RELATING TO THE COLLECTOR, INCLUDING, BUT NOT LIMITED TO: MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY WARRANTIES THAT MIGHT ARISE FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

EXCEPT AS PROVIDED IN THIS WARRANTY AND TO THE FULL EXTENT PERMITTED BY LAW, SPS SHALL NOT BE RESPONSIBLE AND/OR LIABLE FOR DIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OR LOSS RESULTING FROM ANY BREACH OF THE ABOVE WARRANTY OR UNDER ANY OTHER LEGAL THEORY.

PROOF OF PURCHASE:

It is the responsibility of the original Purchaser to establish the original purchase date for warranty purpose. We recommend that a bill of sale or some other appropriate payment record be kept. The following steps should be taken to activate a warranty claim:

1. Contact SPS with details of the defect.
2. Provide pictures of the collector, including close-up images of the problem areas.



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