Enersol
SOLAR PRODUCTS

Determine location and boxes required.
See Sizing Guide

1

Roll out on roof, rack or ground.

2

Clip together using installation tool included with required System Kit.

3

Strap down as shown in instruction manual.

4

Connect plumbing.
Not included.

5

System regulation options.
Manual or automatic.

6

SOLAR PANEL INSTALLATION GUIDE AND OWNERS MANUAL

1.800.884.6444
www.enersol.com
January, 2011

SOLAR PANEL INSTALLATION INFORMATION

If for any reason whatsoever, the installer of this product does not feel comfortable and/or safe, do not proceed with the installation. The installation of this product involves walking on the roof as well as climbing ladders. Do not attempt unless you understand all safety procedures involved with power tools, climbing ladders and working on roofs. To obtain ladder safety, roof safety and power tool safety procedures, contact your local hardware or building supply company and State or Provincial Worker's Safety Board.

The installation of Enersol Solar Panels may be performed on a low pitched (12:12 or 45 degrees maximum angle) shingle and some types of metal roofs. If an installation varies from these types Enersol should be advised and asked for special installation instructions, or visit our website or contact your roof manufacturer. For example, on a flat roof installation, we do not advise cutting into the roof or drilling lag bolts into the roof.

Enersol Products Inc., its agents, distributors and sales representatives are in no way responsible if safety procedures, installation instructions and common sense are not followed, or if Enersol is not consulted should an unusual problem arise. Enersol assumes no liability for installation, parts or labour. If for any reason, you question the installation instructions, DVD, safety procedures and/or installation locations, do not proceed, and contact Enersol immediately at 1-800-884-6444. Remember... SAFETY FIRST!

PANEL BOX

4 sections with pre attached headers
8 clips
8 lag bolts
8 O rings
3 long straps (48")
2 short straps (12")

SYSTEM KIT

Purchased separately – 1 per install
1 warranty card
1 installation guide/owner's manual
1 Enersol installation DVD
1 orange installation tool
1 tube lag bolt roof sealant
1 tube O ring lubricant
2 end caps
2 O rings
2 Header End Connectors (HEC)

TOOLS REQUIRED

Ladder
Safety gear, safety glasses, boots
Variable speed drill
5/ 16" and 3/8" socket drivers
Level
Hacksaw
Chalk line
Utility knife
Caulking gun
Various tools, pliers, etc.

ADDITIONAL PARTS REQUIRED

PVC heavy bodied cement
1 ½ " elbows
1 ½ " tees
1 ½ " pipe
pipe hold downs
couplers
Extra lag bolts
3 way valve or
Automatic controller
One way check valve (optional)
Teflon tape

ASSEMBLY INSTRUCTIONS OVERVIEW

1 Plan your system:

a) Determine the location; south is best followed by west or east. North is not recommended. Panels should be on an angle of 45° or less.

b) Determine the optimum number of boxes needed (see sizing guide below).

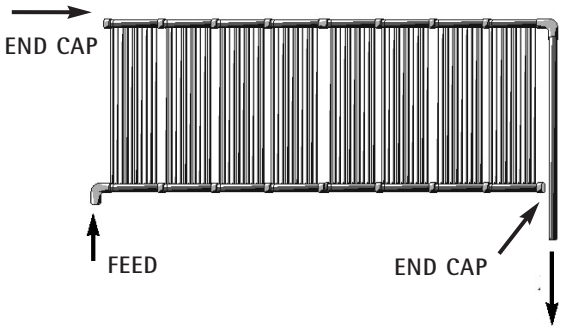
c) Measure roof area available to be sure the panels will fit: Panels must be positioned vertically from eave to peak with at least 6" space around the panels for plumbing and workspace. Four sections of connected headers measure 51", rubber panel strip width measures 48".

d) There are several different types of roofs. Most will accommodate the entire panel system in a continuous row. However, some systems may need to be split over two or more roofs. When splitting a system, try to balance equal sections in each array. Always plumb from a larger bank of sections to a smaller bank. For example, plumb from 10' panels to 8' panels. Remember to be conscious of the best sun exposures, and avoid roofs with shade. If your system is divided between two different exposures (east and west), plumb from the cold side (east) to the warm side (west).

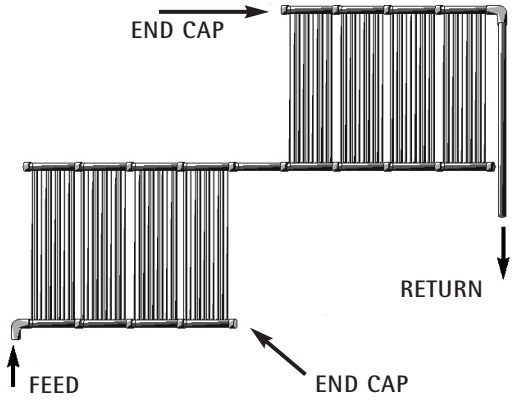
e) Check that your existing pool pump is in good working order.

f) Assemble all the plumbing, fittings, and tools required.

TYPICAL PARALLEL ROOF



TYPICAL SERIES ROOF

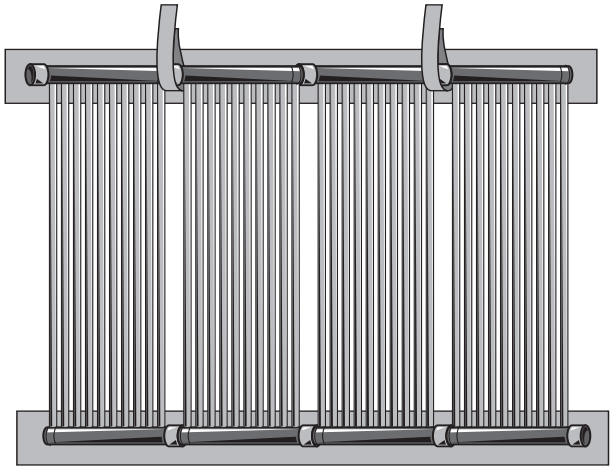


IN GROUND POOL	SURFACE AREA	4 X 8'	4 X 10
12' x 24'	288	5 - 7	4 - 6
14' x 28'	392	6 - 9	5 - 7
15' x 30'	450	7 - 10	6 - 8
16' x 32'	512	8 - 12	7 - 9
18' x 36'	648	10 -15	8 - 11
20' x 40'	800	13 - 19	10 - 15
ABOVE GROUND POOL			
15' Round	176	2 - 4	2 - 3
18' Round	254	3 - 5	2 - 4
21' Round	346	5 - 8	4 - 7
24' Round	452	6 - 10	5 - 9
27' Round	572	8 - 13	6 - 10
12' x 24' Oval	257	3 - 6	2 - 5
14' x 28' Oval	350	6 - 8	4 - 6
15' x 30' Oval	402	7 - 9	5 - 6
16' x 32' Oval	457	8 - 11	6 - 8
18' x 33' Oval	524	9 - 12	7 - 8

This quick sizing guide will help you establish the number of boxes of solar panels required for your pool. The lower number is for a south facing roof with full sun. If the roof is west facing or has more shade, you will need the larger number. The solar rule of thumb is 50% of the pool surface should be represented in solar area. Indoor pools require 100% coverage.

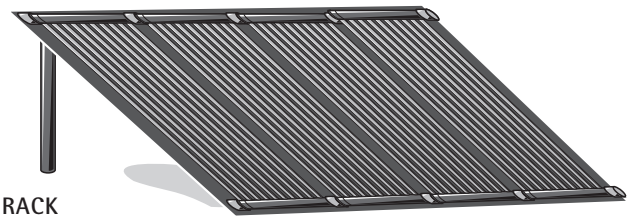
TYPICAL FLAT ROOF MOUNT

Attach headers to 2x6" lumber on each end. 2x6" lumber may then be attached to roof using liquid adhesive. Ensure that the rubber is not blocking any roof drainage.



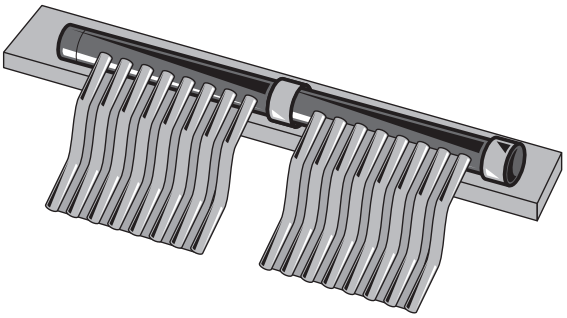
TYPICAL RACK MOUNT

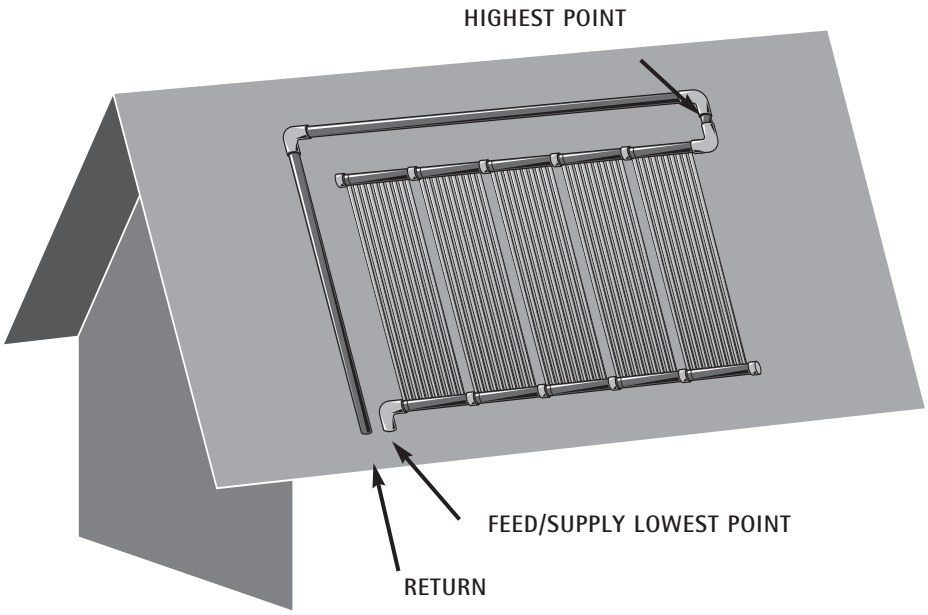
For safety reasons do not mount panels against a pool. Rack plywood should be mounted 45° or less.



TYPICAL GROUND MOUNT

Support headers with 2x6" lumber. Panels may be set on any material that will insulate them from the earth: plywood, metal, plastic or gravel. Note: Flat roof or ground mount panels will not gain heat if sitting in any puddles of water. Ensure proper drainage.





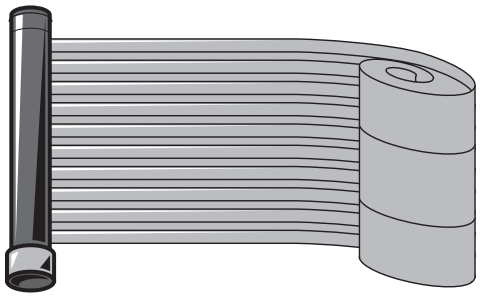
Important:
Angle panels 4 inches for every 40 feet to drain water back to feed/supply inlet. Use chalk lines to reference angle.

2 Roll out panels on roof, rack or ground:

a) Carry the boxes to the installation area.

b) If installing on a roof – snap a chalk line as a guide to where the top of the panels will be aligned. It is important to place the panels on a slight angle on the roof. This helps purge the air from the system when filling, and provides drainage when draining for the winter. Angle the panels 4" for every 40 feet with the slope down toward the end that has the feed line.

c) Carefully take the sections out of the box (give each roll a twist to tighten and pick up from the bottom to prevent tangling), set down, evenly arrange, and allow each section to unroll. If the panel becomes tangled, lay flat and untangle by weaving the bottom header through the panels strips.



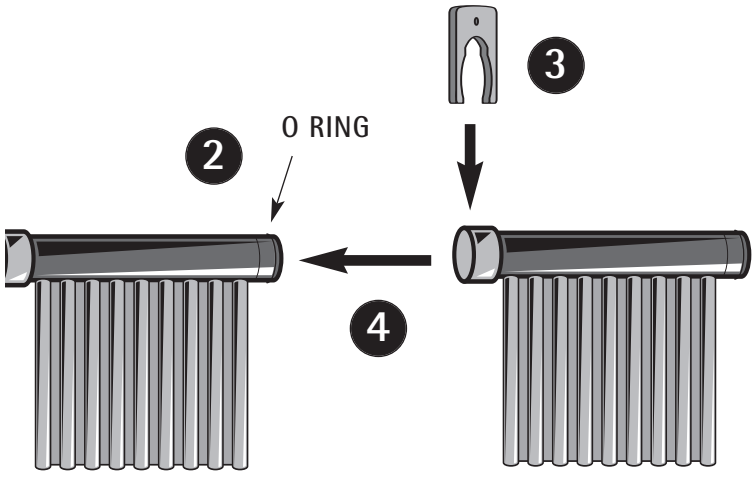
Remove from box carefully and unroll panels. If panels become tangled, lay flat and untwist strips from one end to the other

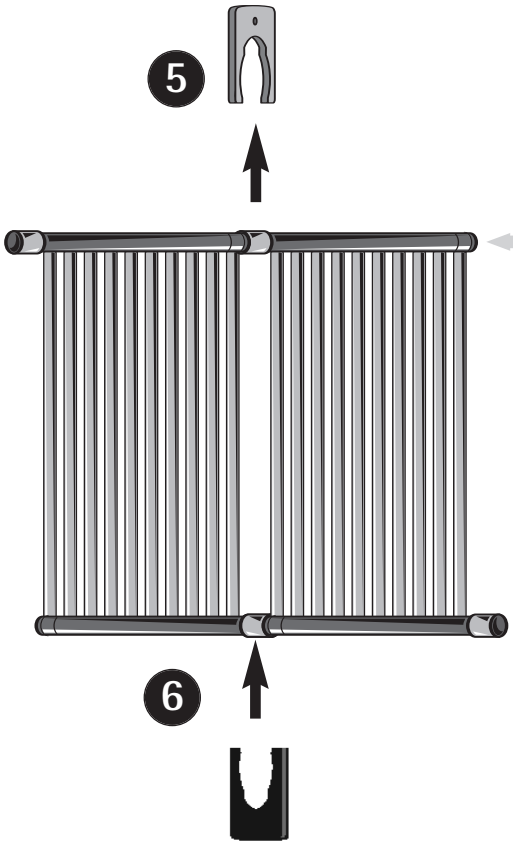
3 Clip together using the installation tool included with the required System Kit.

a) Keep the top header close to the reference chalk line as you begin the assembly.

1. put an O-Ring on the first header
2. lubricate the O-Ring, with supplied lubricant (lithium based)
3. clip the orange installation tool into the slot on the next header
4. push the two sections together
5. remove the installation tool
6. insert black clip to complete the connection

b) Continue this procedure for the top headers until all the panels are connected.





When connecting different versions of headers, always cut off locator tab before connecting.

The orange installation tool must be used

4 Strap down headers and panels

a) Starting at the top end, secure the headers to the roof by placing header straps (12") on every other clip connection

b) Loop the strap around the header, bring the two grommets together and push the threaded lag bolt through the grommets. Check for proper tension, apply a generous dab of roof sealant on the chalk line and secure the lag bolt to the roof.

c) Complete the top row strap installation. On steeper roofs, you may want to strap the headers while you are making the connections to prevent the entire assembly from slipping down. (On steep roofs, or in very windy areas you may want to put a strap on every header – contact your dealer to purchase extra top straps. Straighten the bottom headers by pulling gently and join together as the top headers (see step 3), Bottom headers are not strapped down.

d) To complete the securing process, cross strapping (48") is used. The straps are attached grommet to grommet across the entire width of panels. Starting from the top, the cross straps should be no more than 36 inches apart. Space them evenly, all the way down to the bottom using the proper lag bolts and roof sealant provided. The last row, nearest to the bottom should be no more than four inches from the bottom header. Bottom headers are not strapped down to allow for expansion and contraction of the panels.

e) If your roof has a membrane, or cannot be punctured, it is possible to attach a lumber frame to the roof with liquid nails and attach the lag bolts into the lumber. (Contact your roof manufacturer for advice).

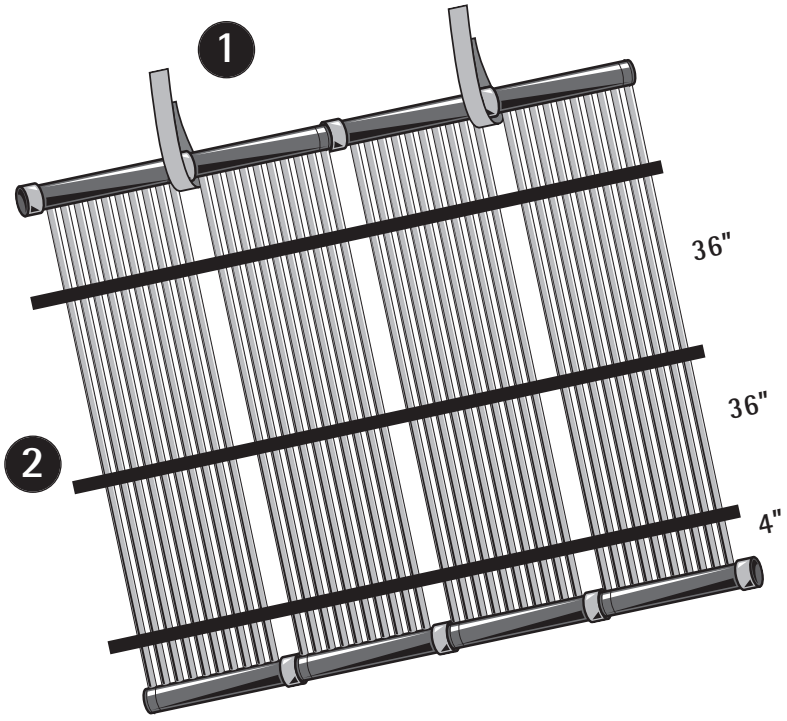
Attach to Roof

1 Top strap

Top strap every other section across top only. Use top strap across the top row every 2 ft. For very steep roofs, order more straps and attach every section.

2 Cross Strap

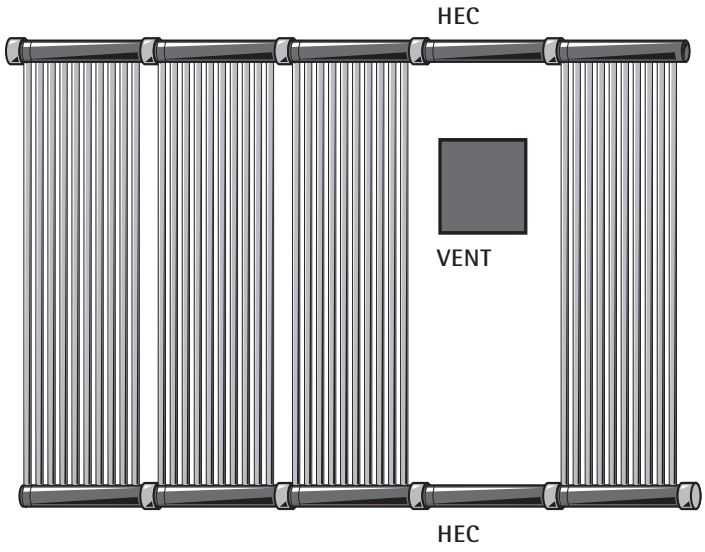
Cross strapping 4 inches from bottom and every 3 ft. up thereafter. Do not over-tighten cross strapping, to allow for expansion. Apply a generous amount of roofing cement. Screw lag bolts through roofing cement into roof. Use roof sealant liberally with all lag bolts into roof.



Never use top straps on bottom

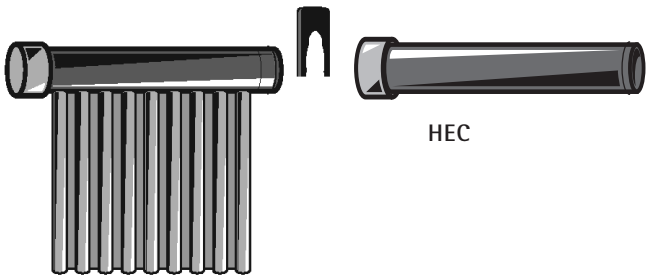
5 Connect Plumbing

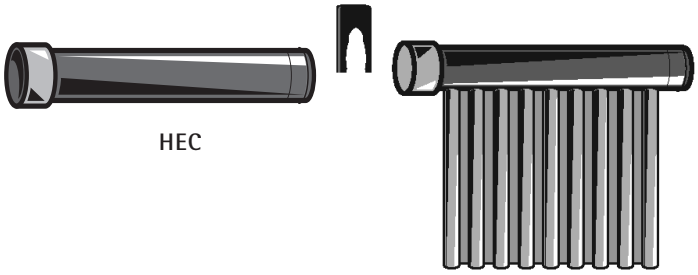
a) Clip the header end connectors (HECs) to create a male and female adapter to the inlet and outlet, diagonally opposite of one another. Remember the feed line goes in the bottom and return comes out the top on the opposite side. HECs can also be used as spacers around small roof vents or similar obstacles. (Purchased separately)



Join Plumbing to Headers

Header End Connector (HEC), included in your system kit, creates a male and a female adapter. These ends are used at the input and output of the array. The HEC clips into place so that the plumbing can be glued to the end. The HEC can also be used as a spacer around vents and chimneys.





Join endcaps to Headers

b) Connect the end caps to the remaining headers. To do this liberally apply cement to the inside lip end of the end cap, steering clear of the threading.

MALE END:

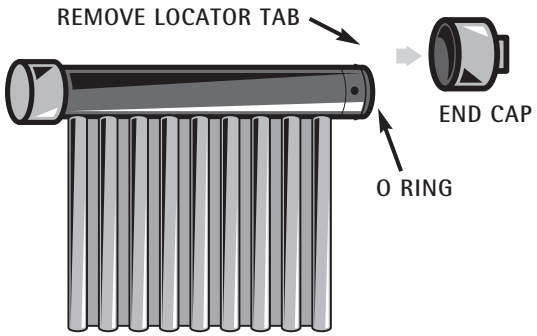
- Remove O-Ring
- Cut locator tab off
- Apply transitional solvent cement liberally to both male and female surfaces
- Cement together

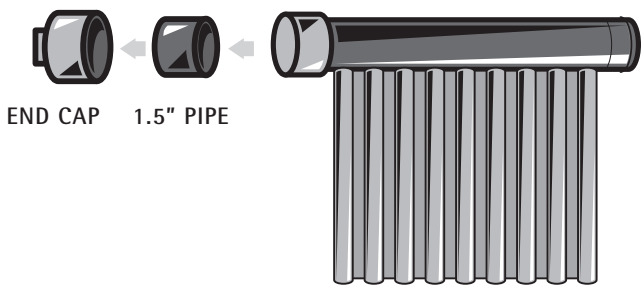
OR

FEMALE END:

- Cut a piece of 1.5" pipe to 3" long
- Apply PVC cement liberally to all surfaces and glue together

Use Teflon to prevent leaking. The end cap has a removable threaded plug to allow for drainage.



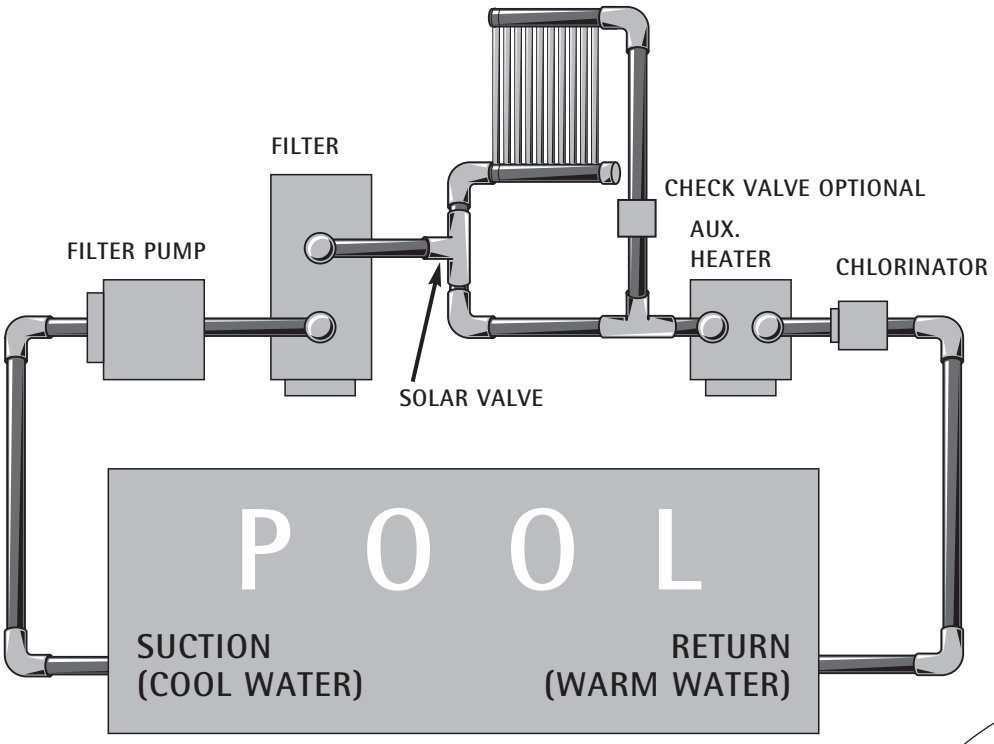


Use Teflon on all End Caps

5 Connect Plumbing (continued)

c) Compete the roof installation by connecting the supply and return water lines: measure twice cut once! If you are travelling a substantial distance from the panels to the pool, consider insulating the underground pipes.

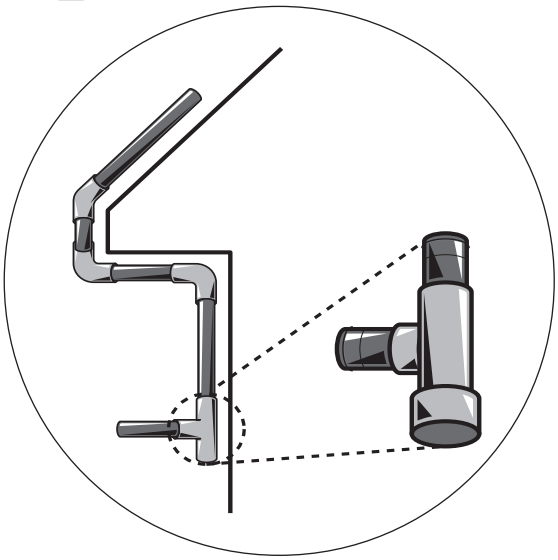
d) Plumbing Layout:
Cool feed from pool (water sensor) ➡ pump ➡ filter ➡ manual or automatic valve ➡ solar panels (roof sensor) ➡ return from panels (check valve – optional) ➡ auxillary heater ➡ salt generator/chlorinator ➡ return to pool



e) The recommended 1.5" PVC pipes are attached to the roof and side of the house with plastic clamps and secured with lag bolts and roof sealant.

f) Be sure to measure and dry fit all pieces to ensure a proper and neat fit around all eaves troughs, then cement (using grey heavy-bodied PVC cement) the connections and assemble. The pipes should be secure, straight, even and close to the house.

g) At any low points in the plumbing use a tee and end cap. This will allow for drainage.



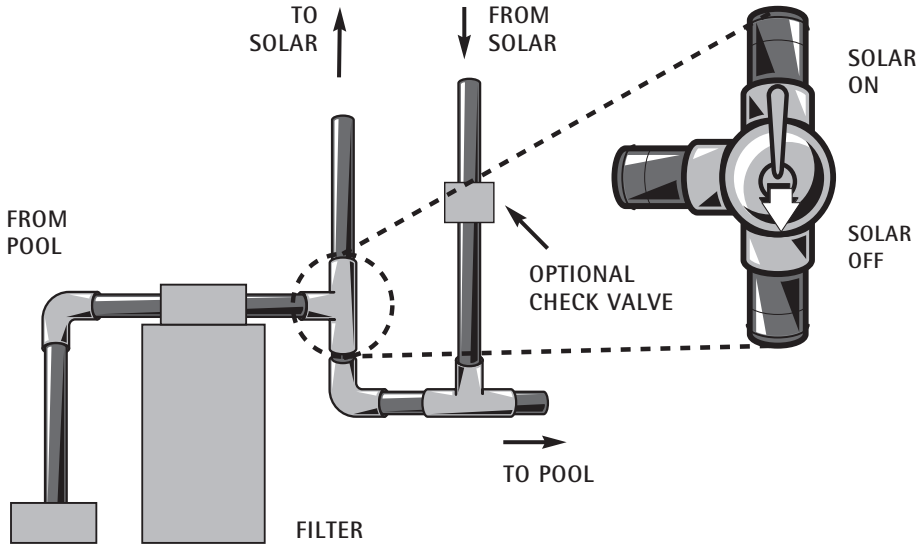
At any low points in plumbing, use a tee and end cap to allow for drainage during winter months

6 A valve is necessary to divert the water to the roof.

a) A 3-PORT MANUAL VALVE CAN BE USED

It must be turned on and off manually when the temperature fluctuates during the day to get the most out of the sun, and must be turned off at night. The valve is installed in the feed line from the pool, with the water coming into the inlet opening. The handle can then be turned to divert the water up to the panels on sunny days or directly to the pool, when not using the panels. Remember that the water flows in the direction that the free part of the handle is pointing, and the Indicator points to the closed side

3-WAY MANUAL VALVE



b) A **CHECK VALVE** is optional, but suggested, to be installed on the return line. This will prevent back flow from the panels

c) An **AUTOMATIC VALVE** relies on water and roof sensors to divert the water. Enersol suggests the Aqua Solar controller. The kit comes with a 3-port diverter valve, actuator, control box and two sensors. Follow manufacturer's instructions for installation of automatic control panel, motorized valve (actuator) and controls.

- Install the Control Box as outlined in manufacturer's instructions. Be sure to wire correctly.
- The manual valve (diverter) is installed as above.
- Remove the locking knob and handle.
- Remove 4 screws from the valve (fit actuator on valve to determine which screws to remove).
- Align the actuator, rotate the actuator until holes on the actuator align with the screw holes.
- Use the 4 supplied screws to secure in place.
- Plug the actuator in the control. Box-in the **FWD VALVE** socket.
- Flick the switch to **SOLAR TEST**. Synchronize the valve handle by flipping the toggle switch at the bottom of the actuator between **ON 1** and **ON 2** to rotate the handle so it points to the solar panel feed line. See full instructions for valve actuator in package, or visit our web site, www.enersol.com and look under "Our System - Automatic Controller".

6 System regulation options (continued)

d) WATER SENSOR

Install the plastic cylinder shaped sensor by drilling a 5/16" hole into the pipe usually between the filter and diverter valve. The gear clamp holds the sensor in place. Two wired connectors are supplied to connect the sensor to two-line sensor wire. The end is wired into the control box (pool sensor screws).

e) ROOF SENSOR

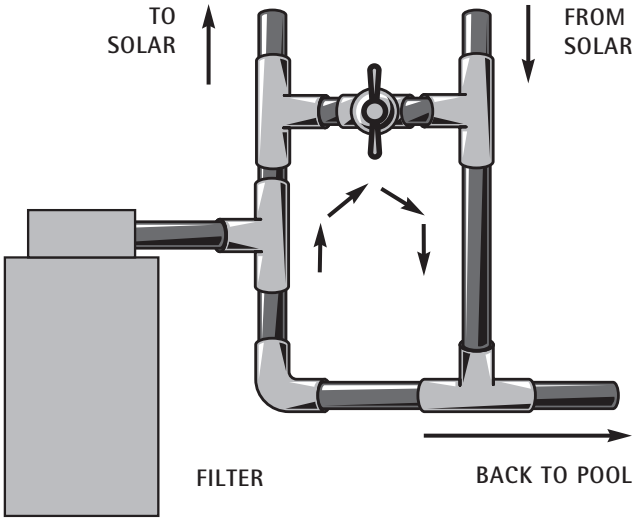
Install the sensor on the roof where it receives sunlight similar to the solar collectors. Two wired connectors are supplied to connect the sensor to two-line sensor wire. The end is wired into the control box (solar sensor screws). The plastic wire protector fits in the hole located in the bottom of the control box.

f) BY-PASS VALVE

A bypass valve is used if the pressure is too great through the system (see flow rates on Tech page). Install a ball valve between the feed and return lines. The ball valve is opened gradually to reduce flow or pressure to the panels.

g) PRESSURE RELIEF VALVE

A pressure relief valve is not necessary, as the Enersol Panels do not collapse when drained.



Finally: double check all your joints, plumbing and wiring. Pressure test the system to test for leaks, then let the cement set for 3 hours. Turn your filter pump back on to get the water flowing.

- Manual Valve: Turn handle to divert water to the panels.
- Automatic Valve: Flick the switch to Auto.

Congratulations! Enjoy your warm pool for many years.

Best Regards,

Team Enersol

h) OHM METER

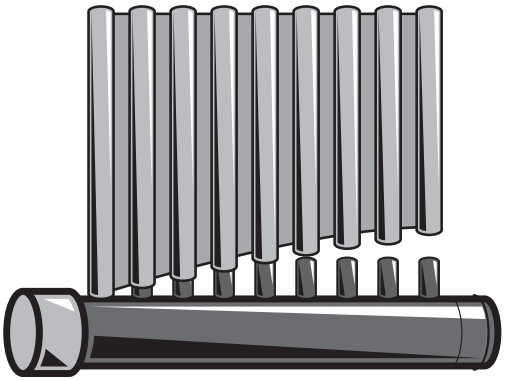
Use an Ohm meter to check the resistance in the sensors. The Ohms readings should correspond with the sensor temperature. Use the chart below to determine if the sensor is sensing proper temperatures.

TEMP	OHMs
70°f	11.8
75°f	10.5
80°f	1.2
85°f	9.2
90°f	7.5
95°f	6.5
100°f	5.8
110°f	4.6
115°f	4.1
120°f	3.7

MAINTENANCE AND TROUBLESHOOTING

Header or Rubber Replacement

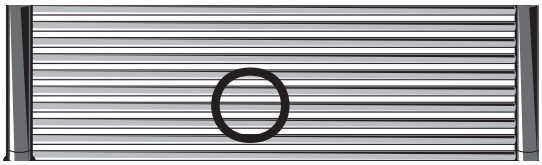
Any header section or length of rubber can be replaced. To remove the rubber, push the rubber off with a flat screwdriver. Attach tubes to the headers by simply sliding them over the nipples. Warm the ends of the tubes in hot water momentarily. Push each tube on until it contacts the header and completely covers the nipple. No clamps are needed.



Always use a clip tool when disconnecting.

Tube Repair

For small isolated holes:
For repair parts contact your Enersol Dealer
or call 1.800.884.6444



IF A LEAK HAPPENS . . . . . INSERT SPLICER

If a Section Develops a Leak

Allow 5 or 10 minutes for the O-ring to seat. Replace O-ring if marked, pinched, nicked or cut. Use O-ring lubricant as supplied.

FLOW RATES
Recommended pump size 3/4 - 1 hp
Recommended operating pressure: 15 PSI @ 120˚ F
Maximum Fluid Pressure: 20 PSI @ 120˚ F
Recommended Flow Rate: 4-10 GPM per 4' width
90˚ elbow adds 6' to 1.5" pipe
45˚ elbow adds 2' to 1.5" pipe

PUMP SIZE	MINIMUM NO. OF SECTIONS
3/4 hp	9
1 hp	12
1.5 hp	18
2 hp	24

If the system is under-sized or pump size is larger, follow by-pass instructions.

Winterization

Winterizaton must be done after your pool is closed.

1) Go to the highest point of the collectors and pipes and open the top corner end cap. Remove the opposite bottom corner end cap. Without disturbing the top and bottom rows of headers, work your way along the panels and gently lift the rubber from top to bottom. If in doubt you can open a section and drain out excess water. Blowing the lines with a shop vac may not remove all of the water.

2) Open all the end caps at down pipes, pump house and blow any underground lines. Make sure that no water remains in any low pipes, sags in pipe valleys or any part of the system. Re-attach the end cap to ensure nothing enters header.

3) Valves must be turned to be halfway open or closed. On motorized valves, turn switch to **TEST** and let valve turn halfway. Pull the electric cord.

4) A general inspection of the roof at this time is wise. Check for loose lag bolts and strapping. Remove leaves and debris that might block the run-off of rain or snow.

Summerization is done if the system is left for a prolonged period of inactivity in extreme heat conditions in excess of 150˚ F. This prevents non-circulating water from becoming stagnant and promoting bacterial growth. The use of a drain down valve and end cap, and a one way check valve is necessary. Follow steps 1-3 for Winterization.

TECHNICAL INFORMATION

- Use PVC pipe for plumbing, ABS is not UV stable and will degrade with outdoor use.
- Use Weld On 711 PVC cement or a heavy-bodied PVC cement.
- Ensure plumbing is straight - measure twice, cut once.
- At any low points in plumbing, use a Tee and end cap. This will allow for drainage in the winter months.
- A pressure relief valve is not required on the Enersol system.
- The Enersol System is not potable water compatible, not recommmended for use with glycol, and cannot be used in a pressurized water system.
- One System Kit is needed for each installation. If you are installing multiple arrays, you will need extra end caps.
- Covering the panels with glazing (plexi-glass or glass) is not recommended.
- The Enersol System is not designed for winter use.

Visit our web site for more information
www.enersol.com