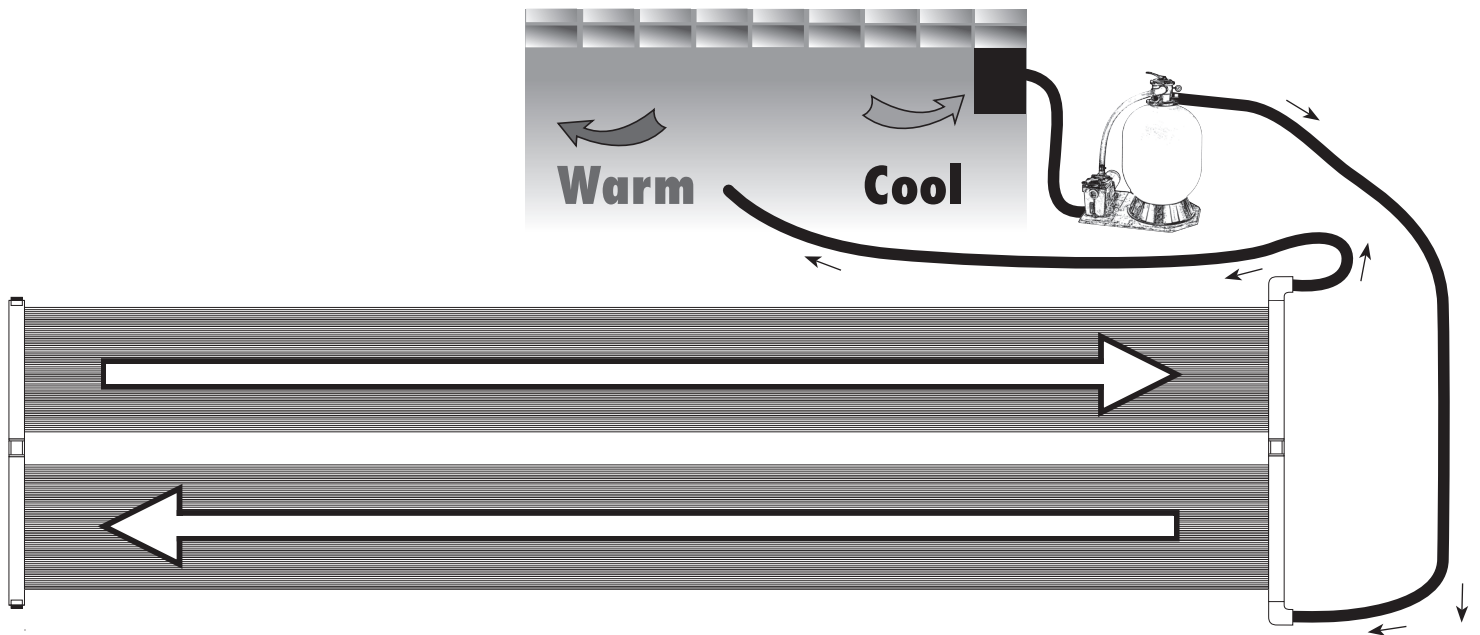


20' Solar Heating System

Item #s 6860, 6947 & 6945

INSTALLATION & OPERATION MANUAL

Please read all instructions carefully before installing your system. Your warranty and your enjoyment of the Solar Heating System is affected by the proper installation of this product.



Introduction:

1. The Solar Panel System is designed to warm your pool water by absorbing warmth from the sun. The water flows through the multiple tubes in the panels collecting heat as it passes through. The heated water is then returned to your pool, thereby heating your pool and saving energy costs.
2. The System connects to the pool pump and filter and requires no additional source of energy or power. The pool pump must be running and water must be circulating through the solar panels for water heating to occur.
3. With proper installation, the System can raise pool water temperature up to 10–15°F and extend your pool season. (Temperature gain is dependent on the number of hours of sunlight in the middle of the day and the ambient air temperature.)
4. The System is made from LDPE resin polymers. LDPE is ideal for its flexibility, resilience and chemical resistance. The System will provide years of use.
5. The flexibility of LDPE material allows for easy handling and fast installation.
6. LDPE polymers will withstand temperatures up to 175°F. This allows you to install it in direct sunlight in a hot location (such as a hot roof) where it can absorb the maximum amount of heat more quickly.

Proper Sizing of a System:

1. The number of Solar Collector Panels required will vary depending on many variables, including: the size of the pool, the number of sunny days, and the average air temperature.
2. On cloudy or rainy days, water circulation through the Panels may actually cool water. If you run your filter at these times, you may purchase the optional Diverter Valve Kit (item #6767). Installing a Diverter Valve will allow water to bypass the Panels and return directly to the pool.
3. A Solar Cover and Reel System must be used for optimal results. Failure to properly use a Solar Cover will diminish heat gain and temperature retention, especially at night. Please cover the pool at night and when not in use.

Determining the Number of Panels Needed:

Round Pool	Oval Pool	Rectangle Pool	20' System (1 panel)	10' System (2 panels)
up to 21'	up to 15' x 25'	up to 14' x 28'	1 System	1 System
24'	15' x 30'	15' x 30'	1-2 Systems	1-2 Systems
28'-30'	16' x 32'	16' x 32'	2 Systems	2 Systems
33'	20' x 40'	20' x 40'	2-3 Systems	2-3 Systems

Northern or cooler climates will require the larger quantity of Systems. Warmer climates may use the smaller quantity of Systems. Additional Panels can easily be added at a later date if you desire.

Location of System:

1. **For best results, the Solar Heating System must be installed in an area that receives direct sunlight for at least 6 hour a day.** This should be in the middle of the day when sunlight is the strongest.
2. The Panels may be placed on the ground, on a rack, or on the roof of a building (i.e. shed, garage, or house). The Panels should face SOUTH to capture the maximum amount of sunlight. Do not face Panels away from the sun, such as on a north-facing roof.
3. If the Panels are installed on the ground, **do not place in a high traffic area. Do not walk on the Panels** as it may damage them and it will void the warranty.
4. Make sure there are no sharp objects where the Panels will lie. Sharp objects can damage the Panels and cause leaks.
5. If the System is mounted on a rack, the rack should be placed at an incline of 30 – 45 °. The rack should not be located where a child can climb on it to gain access to the pool.
6. An optional Roof Mounting Kit (item #6867) is required for proper installation on a roof or rack. (see page 3)
7. With the proper pump size, the System may be located up to 30' from the filter system and on the roof of a 1-story structure.

Pool Pump Size:

1. The pump on the filter system should be a fully rated pump of 1 HP – 1.5 HP.
2. A pump less than 1 horsepower may need to be upgraded for sufficient water flow. After installation of the system and with the filter running, place your hand in the water in front of the inlet fitting. **If you feel weak flow you may first try placing the Panels closer to the pool.**
3. If the pump is larger than 1.5 HP the **optional Diverter Valve Kit** (item #6767) must be installed. Failure to control the amount of water flow with a Diverter valve may result in damage to the panel.

Upgrade pump if needed.

HARDWARE KIT AND PARTS LIST		
REF No.	DESCRIPTION	No. REQ'D
1	O-Ring	2
2	1-1/2" SS Clamp	2
3	1-3/4" SS Clamp	2
4	Small Elbow	1
5	Big Elbow	1



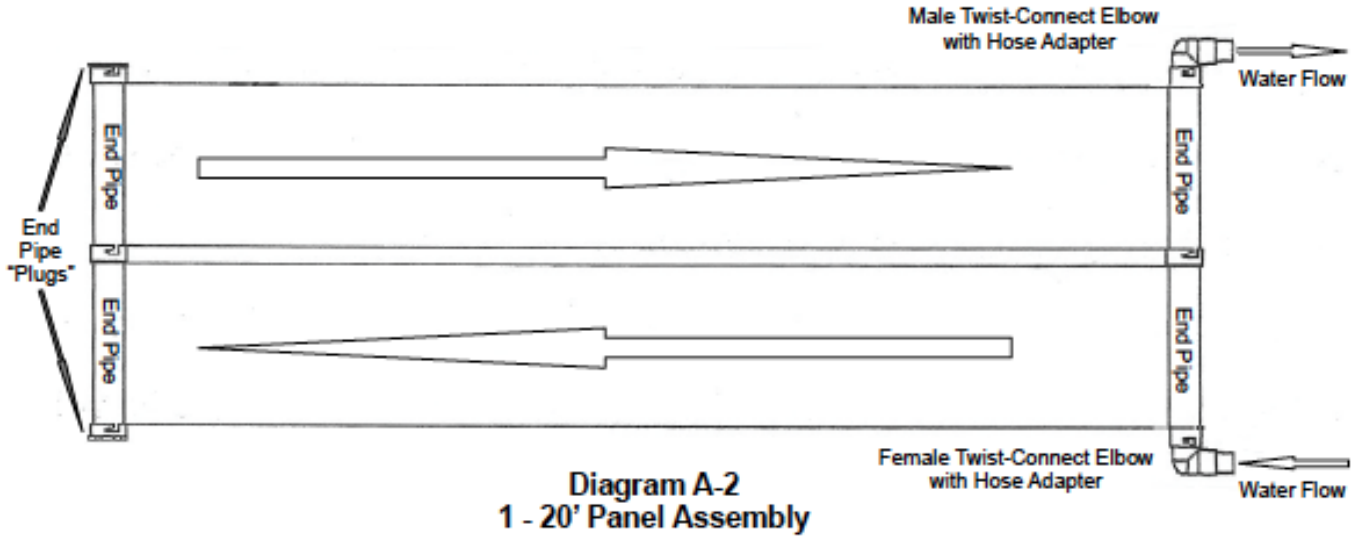
DIVERTER VALVE KIT (Item #6767) OPTIONAL		
REF No.	DESCRIPTION	No. REQ'D
1	Diverter Valve	1
2	Panel Spacer	1



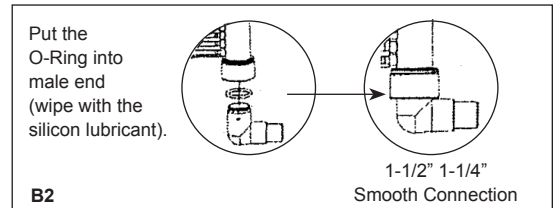
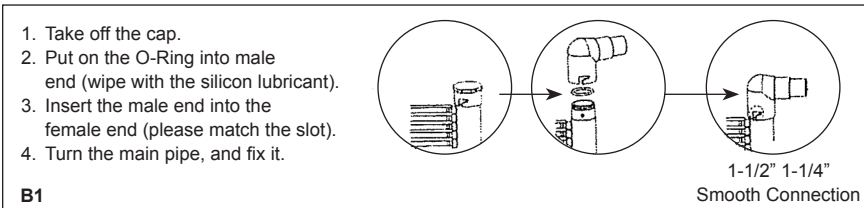
ROOFING MOUNTING KIT (Item #6862) OPTIONAL		
REF No.	DESCRIPTION	No. REQ'D
1	Stainless Steel Bracket	18
2	1.25" x .25" Diameter SS Screws	18
3	78" x 1/2" Nylon Strap	6



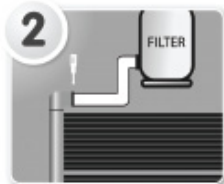
INSTALLING (1) 20' SYSTEM



1. Carefully remove the Panel from the box. A Panel is made of 2 half panels attached together to form 1 panel assembly. This design allows for water to flow into, through, and then out of the panel assembly. The 2 half panels are connected at the factory.
2. Remove the strap and unroll the panel assembly. Allow it to sit in the sun so that it will become more flexible.
3. While the Panel relaxes remove the hardware kit from the box and count all pieces to make sure they are all there. (See picture of Hardware Kit and Parts List Page 3)
4. There is a male and a female Twist-Connect Elbow. Check to make sure the O-Rings are in place on the male side of the End Pipe and the male Twist-Connect Elbow. Make sure the support collar stays in place on the female End Pipe fitting. (see Diagram B1 and B2). Attach both Twist-Connect Elbows to the proper sides of the End Pipe.

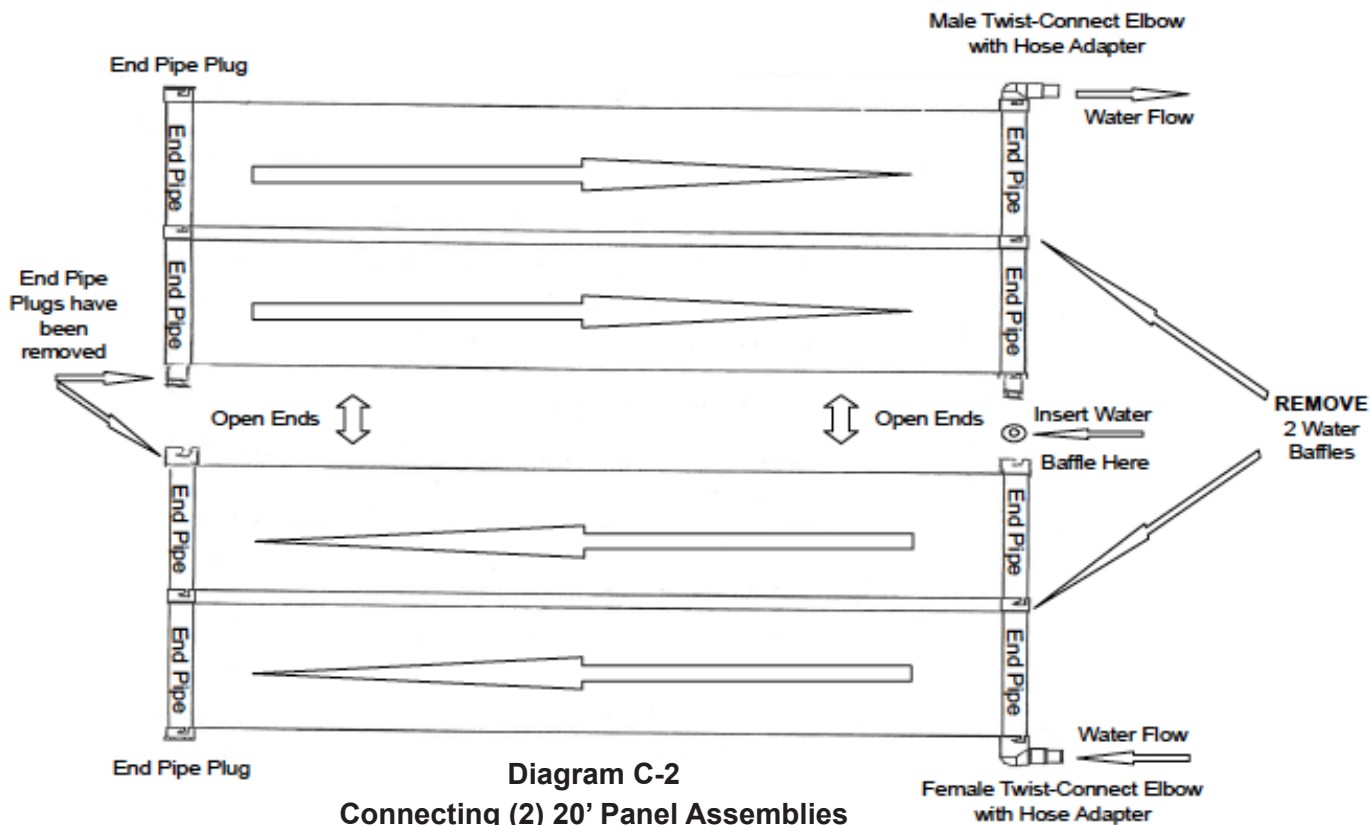


5. **Block the skimmer and inlet fitting to the pool so that water does not rush out.** You are now ready to attach the hoses that connect the panel to the filter system and the pool. The hoses are not supplied and may be purchased at your local pool dealer.
6. If you are using standard ribbed above ground pool hose, place a stainless steel clamp over the (2) hoses you will be using - (1) from the filter to the panel and (1) from the panel to the pool inlet (see #2 and #3 below). Connect the hoses to the hose adapters of the panel and tighten the clamps. Do not overtighten.

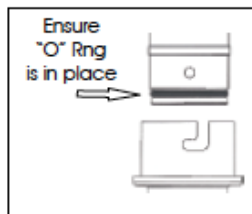


7. Put a clamp on the hose that will attach to the filter. Put the hose on the filter outlet fitting and tighten the clamp. Do not over tighten.
8. Put a clamp on the hose that will connect to the pool inlet. Put the hose on the inlet fitting and tighten the clamp. Do not over tighten. **Unblock the pool skimmer and inlet fitting.**
9. Turn on the pool filter and check to make sure all connections are watertight. You are ready to heat your pool water.

INSTALLING (2) OR MORE 20' SYSTEMS



1. You may be using 2 or more panels depending on pool size. It is easy to connect 2 or more panel systems together.
2. The diagrams above and instructions below will show how to attach multiple panels together. (see Diagram C-2).
3. Installing 2 – 20' systems requires you to **REMOVE** 2 factory installed End Pipe Plugs and 2 factory installed Water Baffles before the panels are joined. (see Diagram C-2).
4. Lay the 2 panels next to each other with the 2 filter hook-up ends (i.e. unplugged ends) next to each other. Make sure the male end pipe connection of one panel faces the female end pipe connection of the other panel. Make sure the support collar stays in place on the female End Pipe fitting.



5. **REMOVE** the 2 End Pipe Plugs that face each other at the side opposite from the filter hook-up side of the panel. The End Plugs are twist-connect plugs and may be removed by hand by turning the plugs counterclockwise. If it is necessary to use a wrench do so, use the smallest amount of force needed. (see Diagram C-2) Make sure the support collar stays in place on the female End Pipe fitting.



Remove
End Pipe
Plugs as
necessary

6. Next **REMOVE** the 2 factory installed Water Baffles (1 from each Panel Assembly). A Water Baffle is a white plastic disc used to direct the flow of water through the small tubes of the panels. It is located in the middle of the End Pipes of the 20' panel at the filter hook-up side. (see Diagram C-2).
7. The 2 Water Baffles are removed by separating the half panels at the twist-connect point in the middle of the End Pipes. Make sure the support collar stays in place on the female End Pipe fitting.
8. **Only one** Water Baffle must be re-installed in the End Pipe connection between the 2 full panels. (The other Water Baffle is discarded.) The Water Baffle is re-installed in the center of the panel system with an equal number of panels on each side of it. It is inserted into the female side of the End Pipe before the 2 Panel Assemblies are joined. The correct location of the Water Baffle directs the flow of water through the panels and **placing the Water Baffle in the right location is very important.** Failure to use a Water Baffle or placing it in the wrong location will greatly reduce the heating ability of the system. (see Diagram C-2).
9. Insert and twist-connect the 2 End Pipes together on each side of the panel. Make sure the support collar stays in place on the female End Pipe fitting.
10. Hook up the filter hose to one side of the panel and pool hose to the other side. You are now ready to use your system. Refer to Use and Maintenance.

11. **Special Note:** If you are installing 3 (or more) panel systems **only one** Water Baffle is used. It will be located in the center of the system with an equal number of half panels on each side of it. All other Water Baffles must be **REMOVED**. Additional End Plugs will also need to be removed to connect all panels together.

12. Optional Diverter Valve Kit (item #6767) Installation (page 7).

Use and Maintenance:

1. Once installed, your Solar Heating System is easy to use. Simply turn the filter system on and your system is working.
2. Place your hand in the water in front of the pool inlet fitting. You should feel a reasonable flow of water returning to the pool. If you do not, you may need to check the size of the pool pump. You may also need to check that only one Water Baffle has been installed in the system.
3. The filter should be run at least 6 hour a day during the sunniest and hottest part of the day for maximum heat gain to occur.
4. When the system is running, the small tubes of the panel will feel cool to the touch as the water passing through the tubes absorbs the warmth of the sun. If the sun is shining and the system is not running the panels will be hot to the touch.
5. If the pool filter is run on cool cloudy days or at night it is recommended that an optional Diverter Valve (item #6767) be used to allow water to by pass the small tubes of the solar panel. Running water through the panels at these times will cool the water.
6. It is strongly recommended that a Solar Cover and Reel System be used for optimal results. Failure to properly use a solar blanket will diminish temperature retention, especially at night. Please cover the pool at night and when not in use .

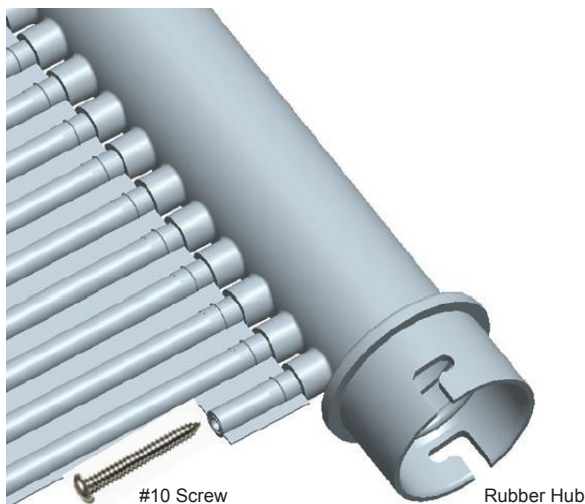
Winterizing the System:

1. **Your Solar Panels must be drained for the winter if temperatures in your region drop below 32°F at any time. THE WARRANTY DOES NOT COVER DAMAGE FROM FREEZING WATER.**
2. For an above ground pool with a ground-mounted Solar Panel, winterize the pool per the manufacturer's instructions. Remove the hoses to the panel. Drain the panel and store it in a warm place for the winter.

- For a rack, roof or In-ground pool installation, remove the 2 Twist-Connect Elbows and allow the water to drain. This may take 30 minutes as the tubes are small and drain slowly. Blow out the panel in the same way you blow out plumbing lines. If you are still uncertain that all the tubes are fully drained, lift the panels at one end to allow any remaining water to drain.
- The panels are designed to withstand winter temperatures and once fully drained, may be left outside on a roof or rack. However, it is recommended that the panels be stored inside during the winter in areas subject to freezing temperatures. The Twist-Connect Elbows were specifically designed to allow easy installation and **removal** of the panels.

Panel Repair:

- If a tube in a panel is nicked, cut or damaged in any way so that the tube leaks the panel may be repaired.
- With a sharp utility knife carefully cut away approximately 12 in. of the damaged tube at each end of the tube where it connects with the rubber hub of the End Pipe. Do not cut away the hub.
- Screw a #10 stainless steel sheet metal screw into the hub at each end. Do not over tighten. This will seal off that specific tube. Water will no longer flow through it, but the rest of the panel will still work well.
- If the #10 screw strips out over time, try a #12 screw in its place, as this will usually work to extend the life of the repair.
- When the repair no longer works or **if multiple tubes are damaged, the complete half panel may be easily removed and replaced with a new half panel.** The twist-connect panels were specifically designed to allow easy removal and installation of a new panel.



OPTIONAL DIVERTER VALVE KIT (Item #6767) INSTALLATION



DIVERTER VALVE KIT (Item #6767) OPTIONAL		
REF No.	DESCRIPTION	No. REQ'D
1	Diverter Valve	1
2	Panel Spacer	1

- A Diverter Valve is used in place of a Water Baffle (A Diverter Valve and a Water Baffle are **NEVER** used in the same system.) The Diverter Valve allows some or all of the water to bypass the small tubes of the solar heating system. The small tubes are where the heat collected from the sun is transferred to the water. Water that does not flow through these tubes will not be heated.
- You may wish to use a Diverter Valve in mid-summer to prevent the water from becoming too warm.
 - You may wish to use a Diverter Valve if you run your filter at night or on cool cloudy days. Water passing through the panels at these times will be cooled.
 - You may need to use a Diverter Valve if you have a very powerful pump to prevent damage to the tubes in the panels.
- A Diverter Valve Kit consists of the actual valve that is installed inline in the panel end pipe and a Twist-Connect Panel Spacer that is installed in the End Pipe at the opposite side from the Diverter Valve.
- Please examine the Diverter Valve and note the location of the valve handle when it is in a closed position, in an open position, and in a partially open position.
- A closed Diverter Valve directs all of the water through the tubes for **maximum heating**. An open Diverter Valve allows all of the water to bypass the tubes and **no heating takes place**. A partially open Diverter Valve directs some of the water through the tubes and allows some of the water to bypass the tubes to control the rate of heating of the water or to control the pressure that is put on the tubes from an oversized pump.

6. **On a Single 20 ft System:** the 2 panel halves are disconnected at the center of the end pipes at the twist connect points. The Water Baffle is **REMOVED** from the filter hookup side. Place the Diverter Valve between the panel halves at the side where the filter and pool hoses connect. Place the Panel Spacer between the panel halves at the opposite side. **Make sure the O-Rings are in place on the male ends of both the Valve and the Spacer.** Make sure the support collar stays in place on the female End Pipe fitting. Insert and twist-connect the Valve and the Spacer into the 2 panels. You are now ready to control the flow of water through the many small tubes of the system. [see Diagram D (a)].
7. **On a Double 20 ft System:** 2 factory-installed Water Baffles MUST be removed as described above in the instructions for “Connecting 2 Panel Systems Together”. Place the Diverter Valve between the panels at the side where the filter and pool hoses connect. Place the Panel Spacer between the panels at the opposite side. Make sure the O-Rings are in place on the male ends of both the Valve and the Spacer. Make sure the support collar stays in place on the female End Pipe fitting. Insert and twist-connect the Valve and the Spacer into the 2 panels. You are now ready to control the flow of water through the many small tubes of the system. [see Diagram D (b) page 9].
8. **On a Single 10 ft System:** The Diverter Valve and the Panel Spacer are installed between the 2 panels. When installing a Diverter Valve and Panel Spacer on a 10 ft system **NO** Water Baffle is installed. Place the Diverter Valve between the panels at the side where the filter and pool hoses connect. Place the Panel Spacer between the panels at the opposite side. Make sure the O-Rings are in place on the male ends of both the Valve and the Spacer. Make sure the support collar stays in place on the female End Pipe fitting. Insert and twist-connect the Valve and the Spacer into the 2 panels. [see Diagram D (b) page 9].
9. **On a Double 10 ft System:** Diverter Valve and the Panel Spacer are placed in the middle of the system with an equal number of panels on either side. Do NOT install a Water Baffle. Twist-connect all panels together as described above. [see Diagram D (c) page 9].

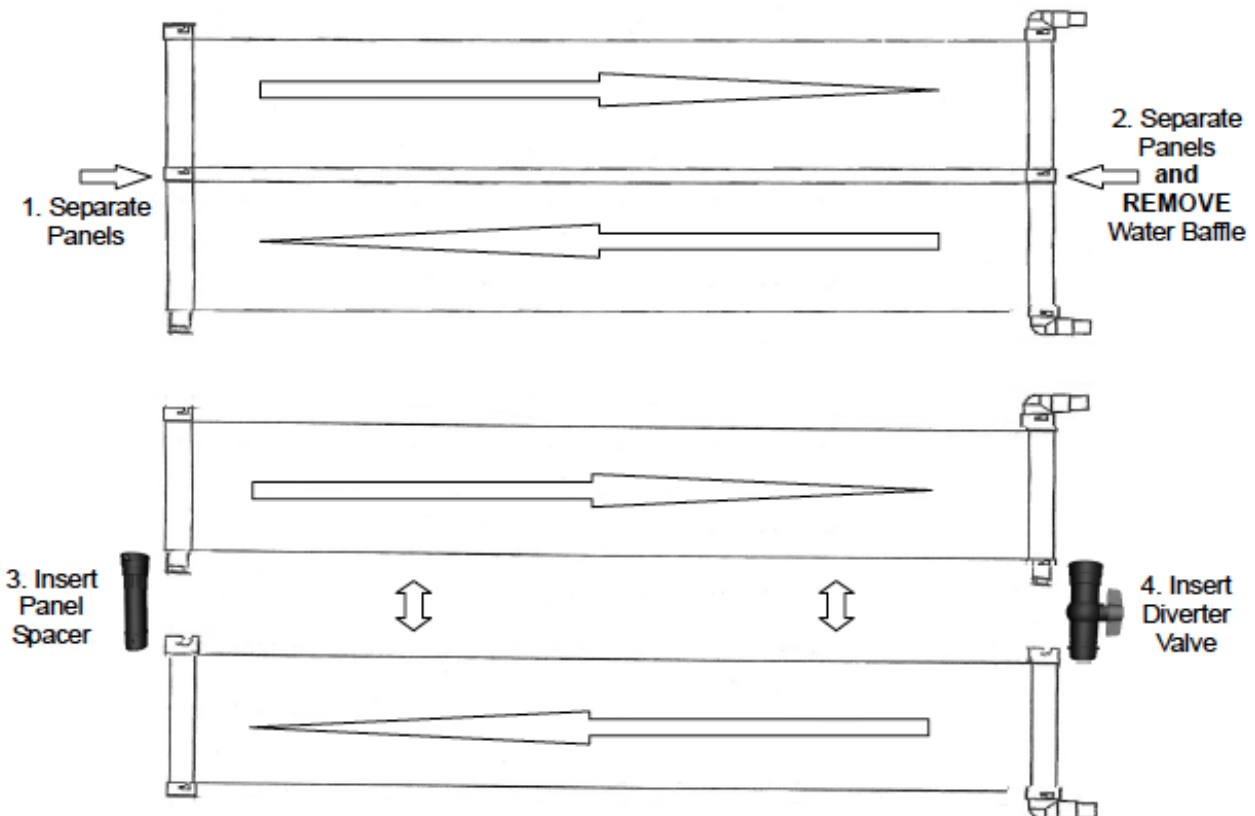


Diagram D (a)
(1) 20' System Diverter Valve Kit Installation

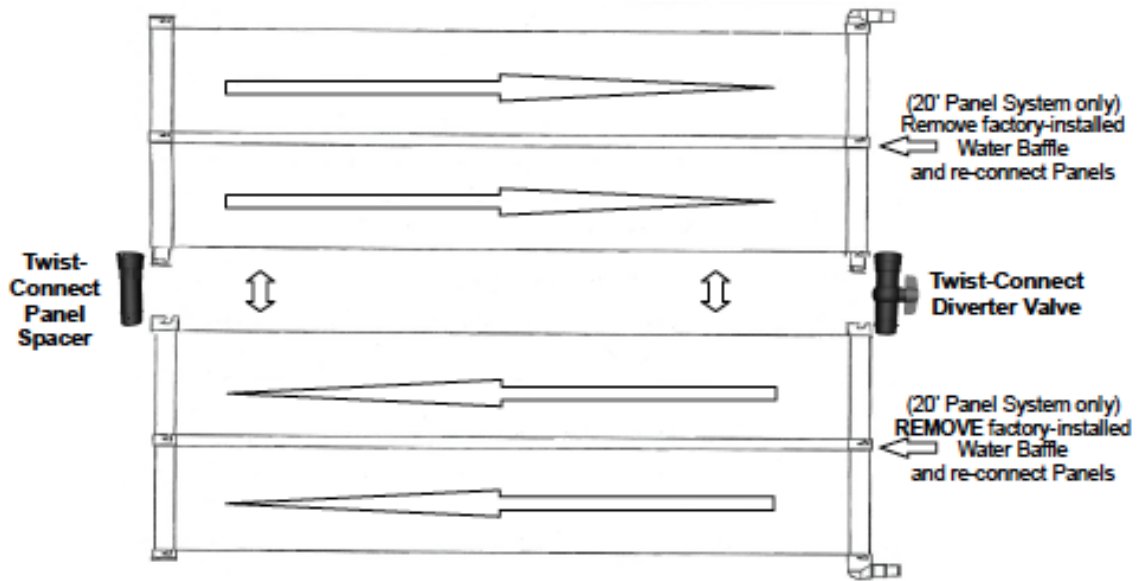


Diagram D (b)

(1) 10' or (2) 20' Panel System Diverter Value Kit Installation

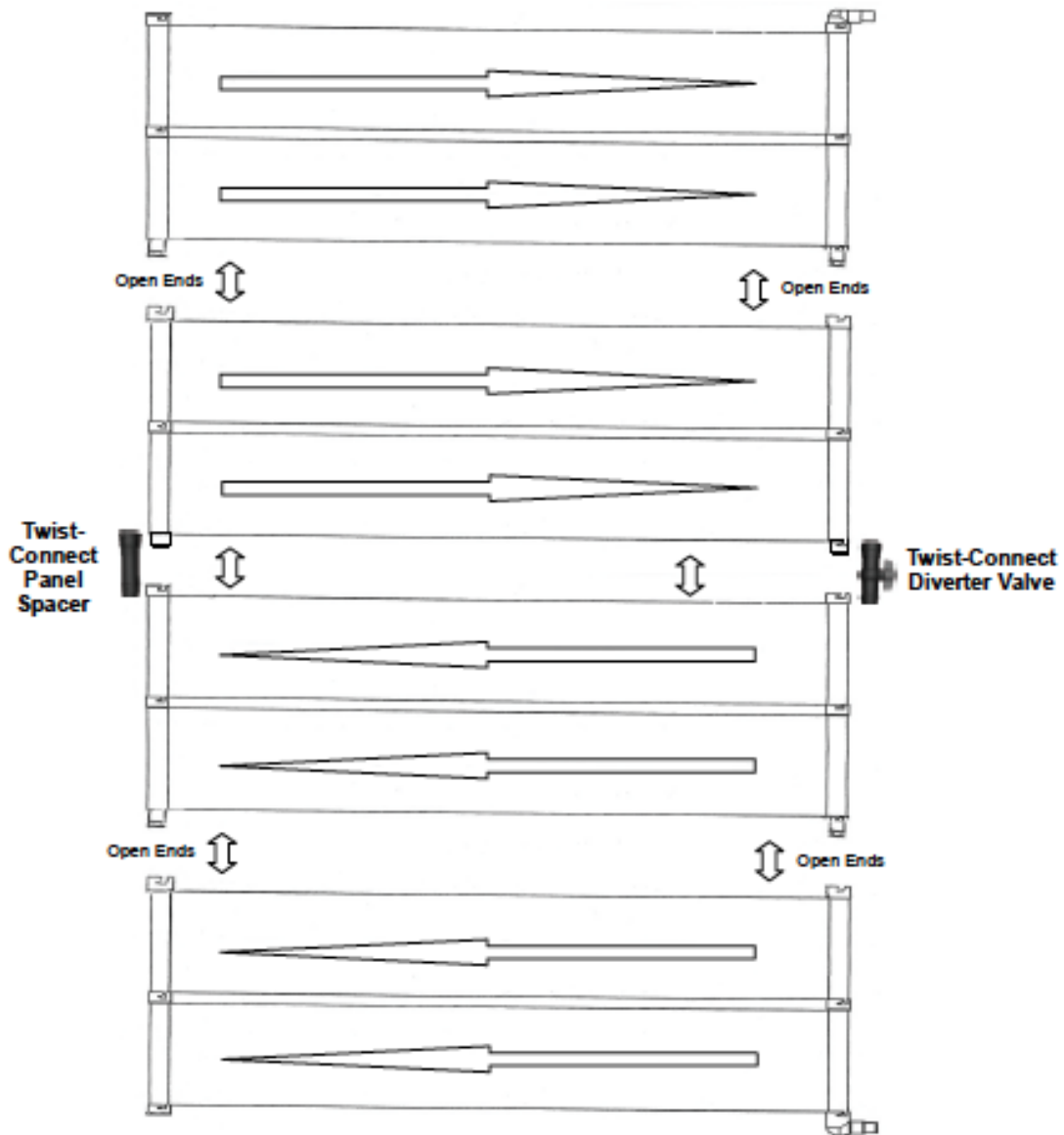


Diagram D (c)

(2) 10' Panel System Diverter Value Kit

OPTIONAL RACK OR ROOF MOUNTING KIT (Item #6862) INSTALLATION



ROOFING MOUNTING KIT (Item #6862) OPTIONAL

REF No.	DESCRIPTION	No. REQ'D
1	Stainless Steel Bracket	18
2	1.25" x .25" Diameter SS Screws	18
3	78" x 1/2" Nylon Strap	6

- If you choose to install your Solar Panels on the roof of a building you must have proper ladders and safety equipment for such work. **If you do not have the proper equipment and experience of working on roofs it is strongly recommended that you hire a professional to complete the installation of the solar panels. Falling from a roof can cause serious injury.**
- If mounting the solar panels on a rack, the rack should be placed at an incline of 30-45°F. The rack should not be located where a person can climb on it to gain access to the pool.
- The roof or rack that a solar panel system is mounted on should be facing **SOUTH** toward the sun. A north facing panel system will not warm the water.
- You will need to purchase one or more of the Roof Mounting Kit (Item #6862) (see Diagram E). You will also need to purchase a good quality exterior silicone sealant suitable for use on a roof.
- If the system is to be mounted on a roof it is recommended that you use schedule 40 PVC plumping pipe for connecting your solar panels to the filter and pool. You may buy this at your pool dealer or a home improvement store.
- Locate the place on the roof or rack where the panels will be installed. The panels must be installed at an angle, such that the hook-up side is lower than the opposite side (see Diagram E & F page 11). This will allow the panels to be drained for the winterization.
- Plan a slope of 2" from one side to the other for a 10 ft panel system (see Diagram E page 11). Plan a slope of 4 in. for a 20 ft panel system (see Diagram F page 11). Next draw a chalk line where the bottom edge of the panel will be.
- One row of stainless steel brackets from the roof mounting kit will be installed along this line. A bracket must be installed every 4 ft as a maximum distance. In high wind areas the brackets should be installed every 2 ft. **Installing in high wind areas will require you to purchase more than 1 roof mounting kit.**
- Drill a 1/8 in. pilot hole where each bracket is to be located. Put sufficient silicone sealant in each hole so that no damage is done to your roof. Screw the stainless steel bracket in place with the stainless steel screws included in the kit so that the bottom edge of the panel will sit in the 'J Hook' of the bracket. Doheny's is not responsible for any damage to roof from improper installation.
- Repeat this process for the center line of your panel system locating each bracket vertically in line with the lower bracket.
- Install a line of brackets at the top edge of the panel system with each bracket in line with the 2 brackets below it.
- Thread a web strap through a row of 3 vertical brackets and tie the strap to the top and bottom bracket. Repeat this for each vertical row of brackets. These straps hold the panel to the roof when the wind blows.

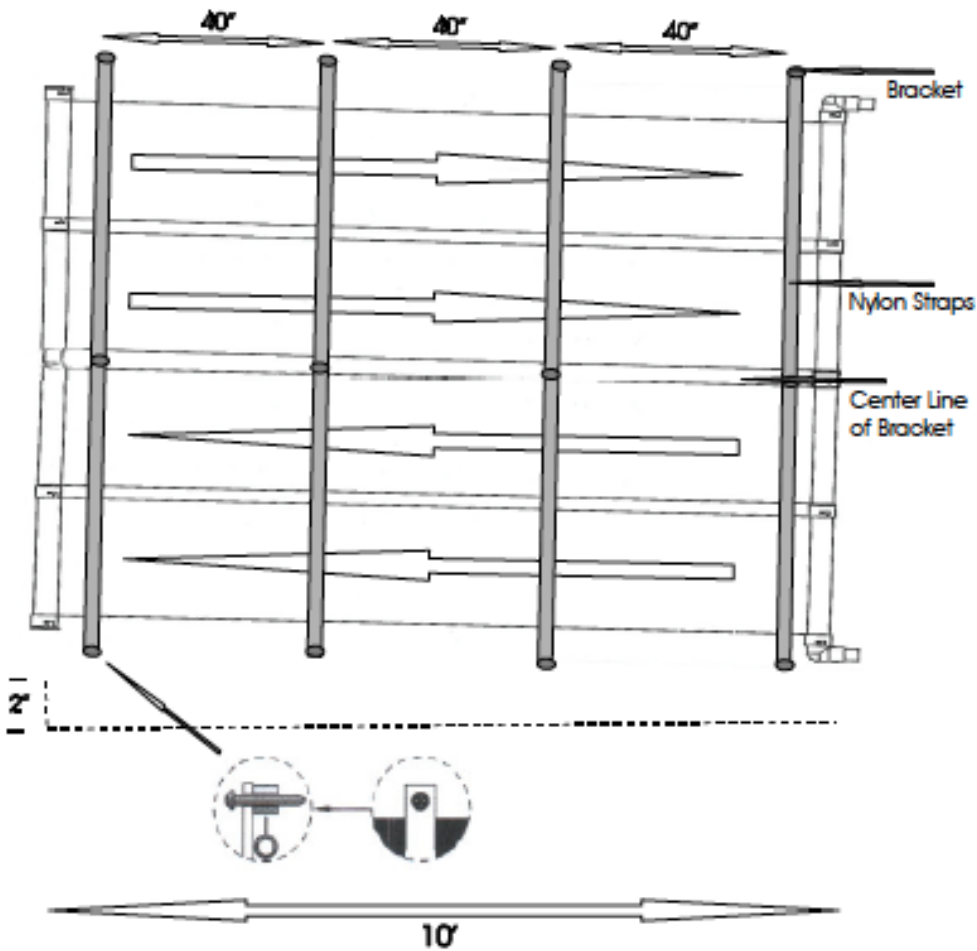


Diagram E
Rack or Roof Mounting Kit 10'

- 2 in. rise over 10 ft distance
- 4 straps minimum
- 40 in. maximum between straps
- High wind areas require more Straps / Brackets

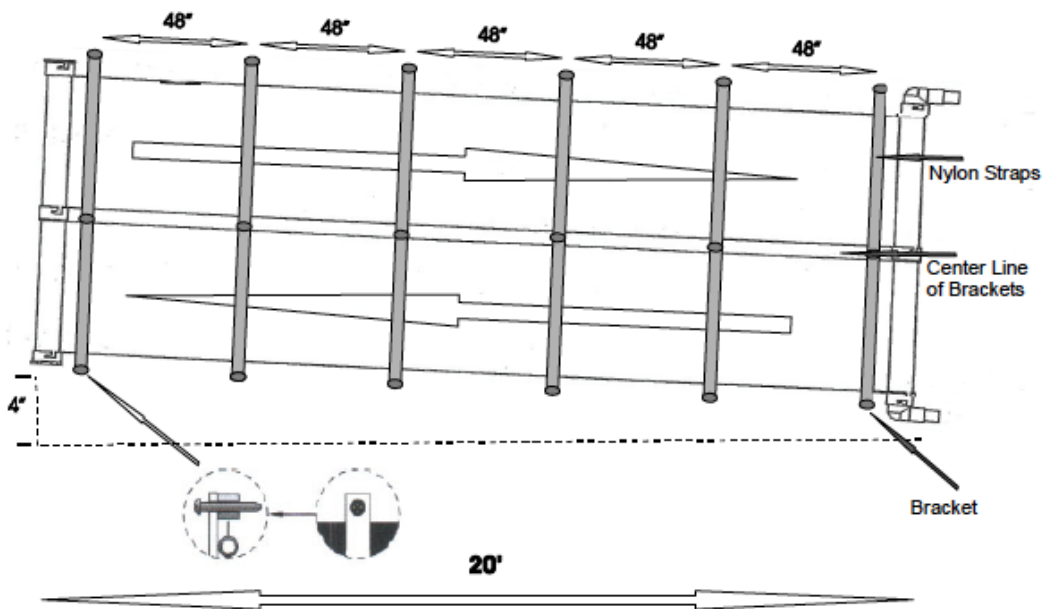


Diagram F
Rack or Roof Mounting Kit 20'

- 4 in. rise over 20 ft distance
- 48 in. maximum between straps
- High wind areas require straps every 24 in. **MUST** purchase 2 Rack or Roof Mounting Kits.