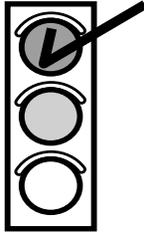


3 Guidelines For Installing Roof Collectors

**Professional
Only**



! WARNING

Because variables such as local codes and structural differences are inherent in each individual location, the following information should be viewed as general guidelines for licensed plumber before starting the work.

! WARNING

For safety reasons, and to avoid improper roof penetration, installation of the Rooftop Collectors should only be done by a qualified, insured roofing contractor.

! CAUTION

Rafter location is vital. Lag Bolts must be fastened in the center of a rafter in order to be secure,

NOTE: *Collectors should be installed as high as possible on the roof to avoid shading and excessive snow loading*

TIP: *Use existing penetrations or markers to measure location of rafters (ie. toilet unit, chimney, dormer, satellite wire)*

3A: Locating the Roof Rafters and Mounting Bracket Positions

The Solar Collector(s) are mounted to the roof by four (4) L-Brackets that must be bolted to Roof Rafters using the supplied 3" Lag Bolts.

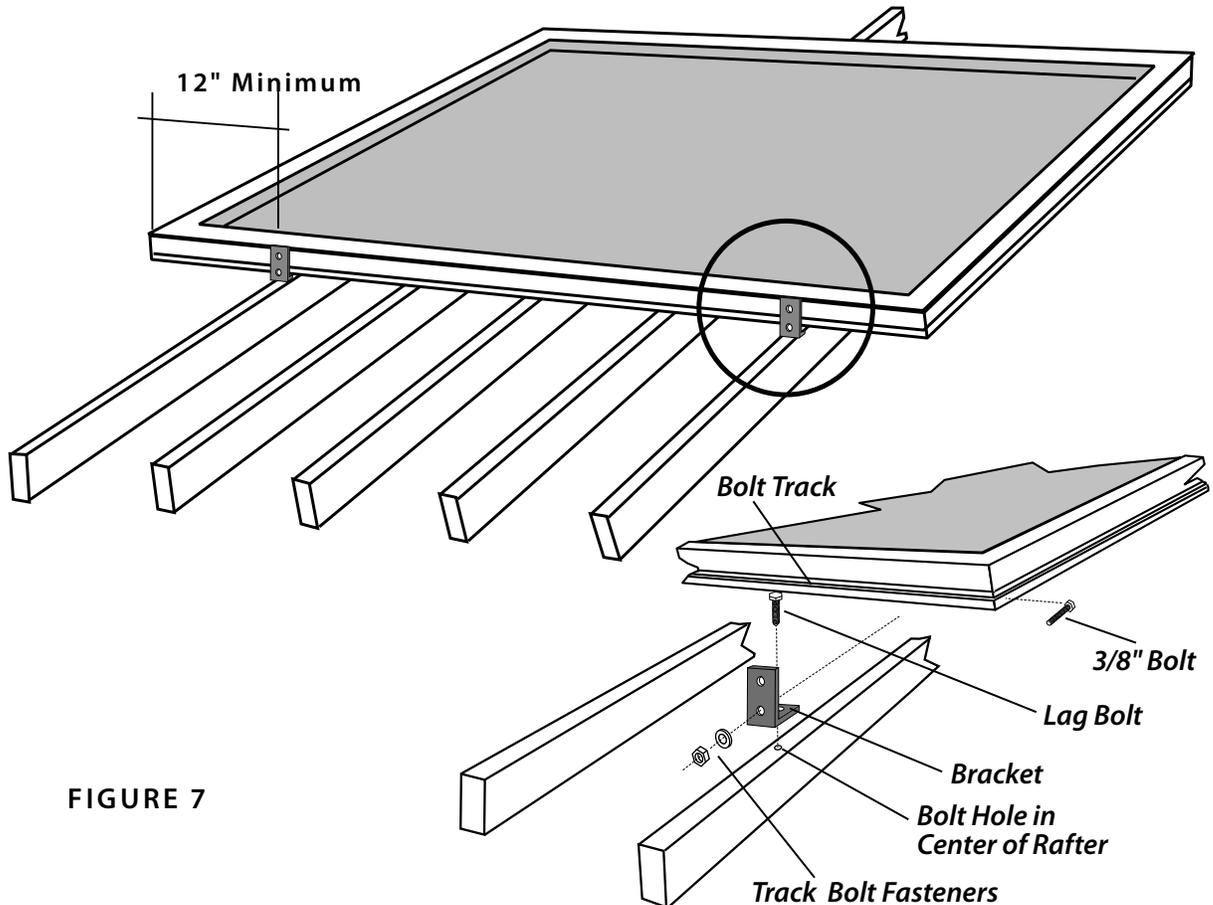


FIGURE 7

1. Confirm the desired location of the Collectors and Rafters.
2. Locate a Rafter directly under the intended Collector location and determine the rafter spacing in that area.
3. Figure 7 shows the preferred location and orientation of the Mounting Brackets. Install the Brackets as close as possible to the locations shown using the existing Rafter spacing.

For example, in the case of a 4' x 8' Collector and 24" rafter spacing, the Brackets should be mounted six (6) feet apart (*that is, one (1) foot from the edge of the Collector*).

3B: Single Collector Installation (Primary only)

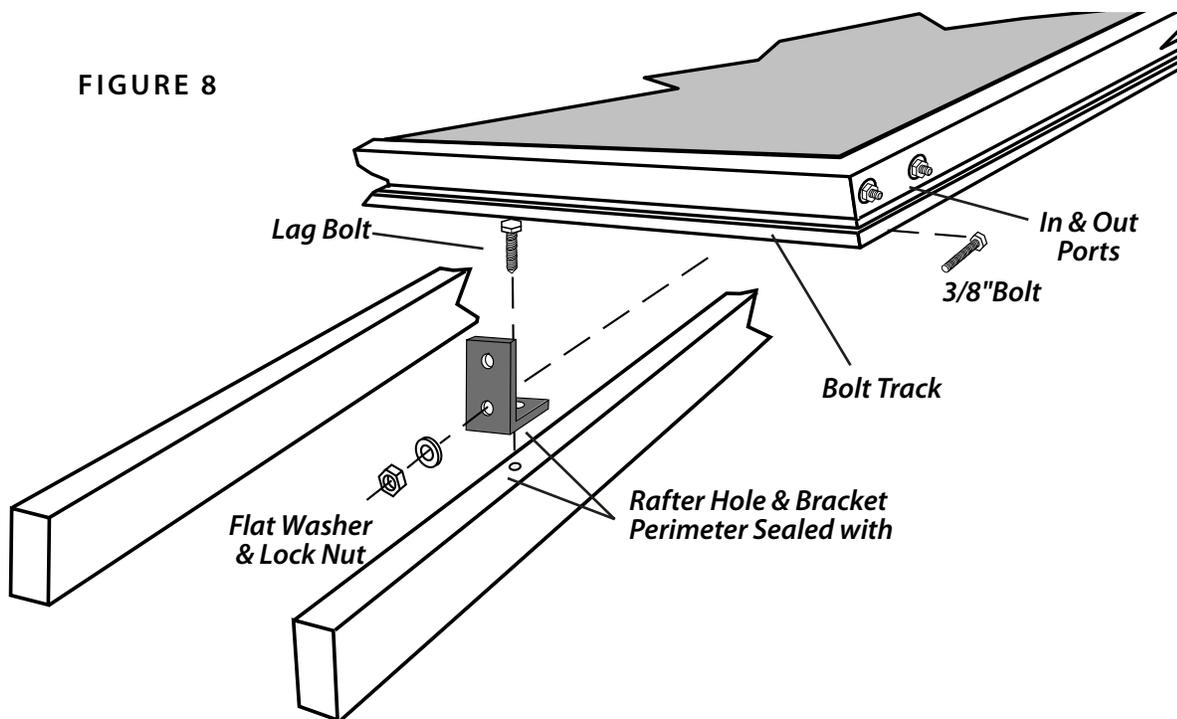
NOTE: The following instructions are for the installation of one Collector only.
For a two Collector installation please refer to Section 3D.

1. Confirm the Rafter location and drill a 1/4" hole through the roof and into the Rafter.

TIP: It is best to drill a small pilot hole first to be certain that you have located a rafter and to provide a guide for the final 1/4" drilling.

2. Fill the drilled Mounting Holes in the rafters with the Tripolymer Sealant sealant provided and secure the two (2) Lower Brackets to the roof rafters using the supplied Lag Bolts. Seal the perimeter of each Mounting Bracket Base with the sealant.

FIGURE 8



3C: Mounting the SUNWARD Solar Collectors

WARNING! Always use gloves when working with the Copper Ports and Collector Panels that have been exposed to the Sun.

TIP: The collectors will quickly heat up in sunlight. Keep the Collectors in the cardboard shipping containers until ready for installation.

There are two types of Solar Collectors, Primary and Secondary. A Primary Collector has IN and OUT Ports and a Thermister Plug Port (**Figure 9**). A Secondary Collector will have two sets of IN and OUT Ports only.

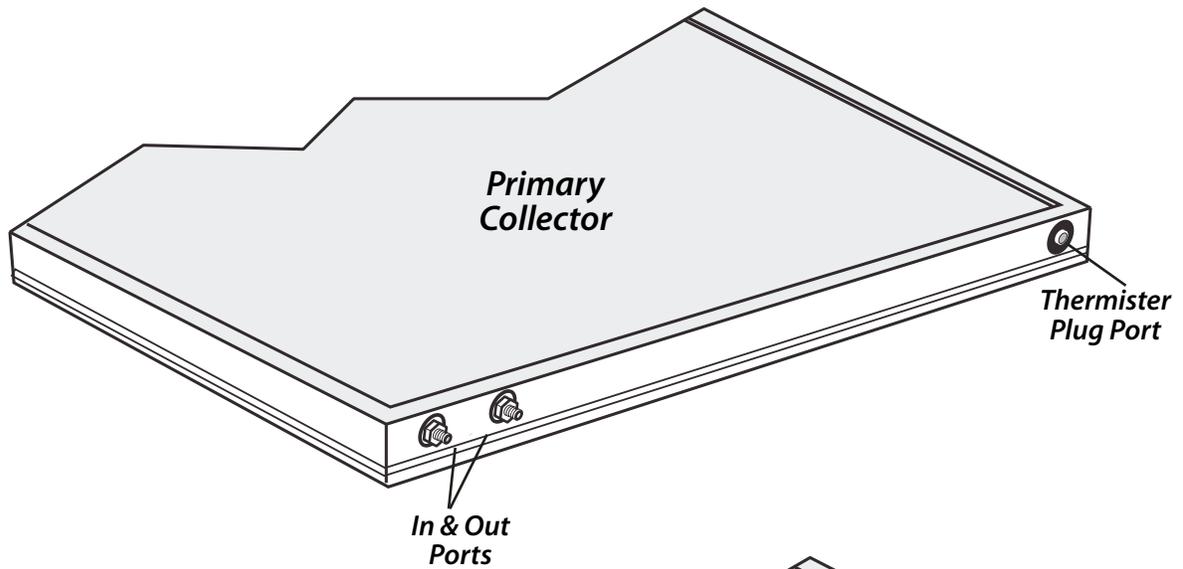
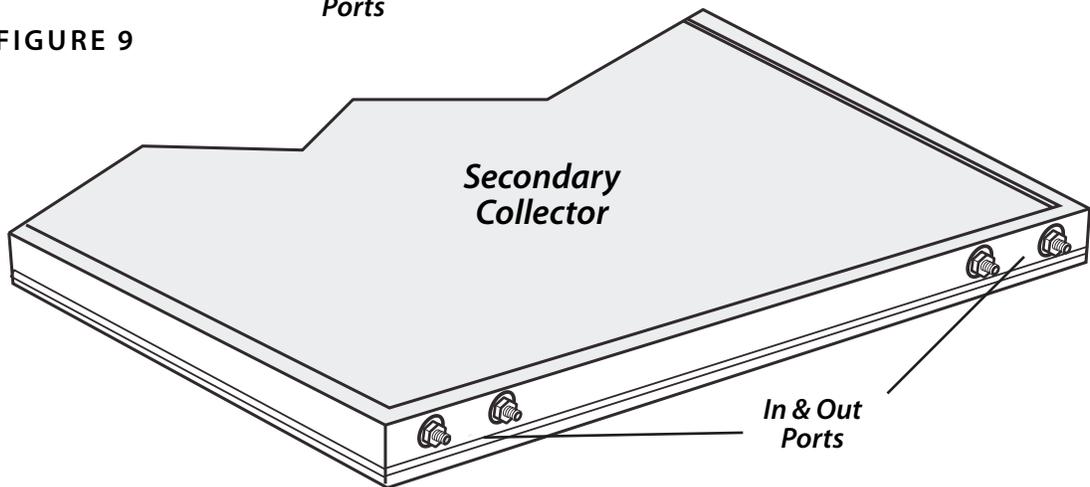


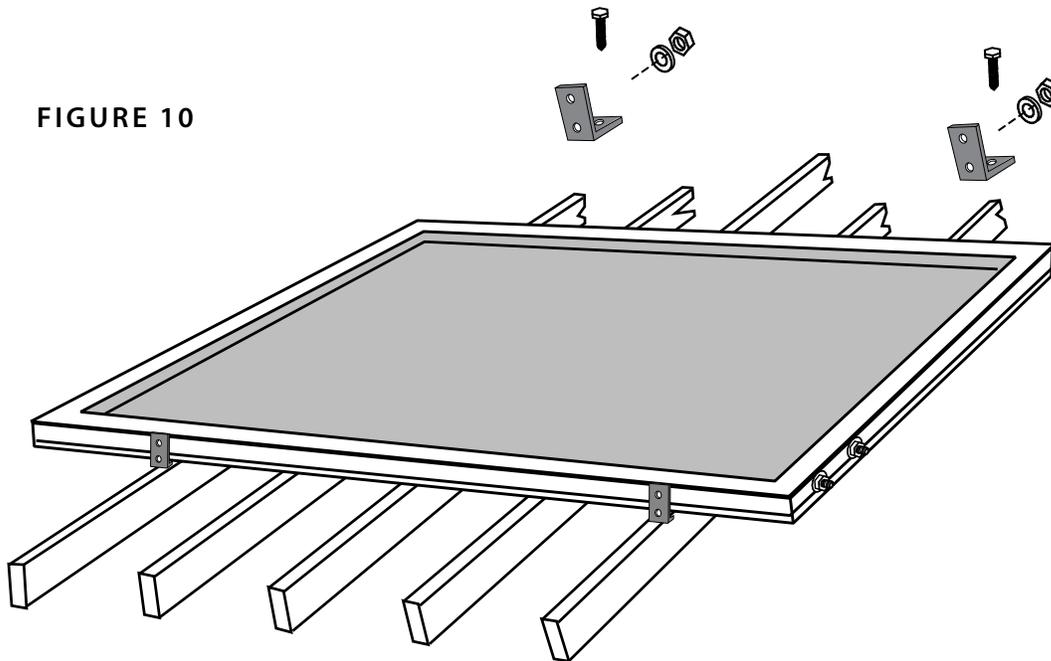
FIGURE 9



NOTE: Orient The Primary Collector with the Ports on the lower right hand corner of the Collector when viewed from below.

3. Place the Primary Collector on the roof with the lower edge resting against the Mounting Brackets.
4. Slide the 3/8" Bolt heads into the Bolt Track and align them with the Lower Mounting Brackets.
5. Move the Collector up and off of the Brackets and guide the aligned bolts into the lower hole of the Brackets as the Collector is re-positioned.
6. Apply a Flat Washer and Nylon Lock Nut to each Bolt and loosely fasten. Center the Collector so the spacing from the end of the Solar Collector to the Mounting Brackets is equal on both ends.
7. Slide the 3/8" Bolt heads into the Upper Bolt Track. Align the Upper Mounting Brackets over the Bolts and slide the Brackets and Bolts into position over the selected rafters.
8. Drill through the Mounting Bracket holes into the rafters. Apply sealant as in Step 2.
9. Insert the Lag Bolts and tighten securely. Apply Flat Washers and Nylon Lock Nuts to the 3/8" Bolts. Tighten all securely.

FIGURE 10



3D: Two Collector Installation (*Primary & Secondary*)

NOTE: In two (2) Collector systems, the Primary Collector is placed above the Secondary Collector and oriented so the Ports are all on the same side (**Figure 9**).

1. Referring to the instructions for the single Collector Installation, install and align the Secondary Collector in the lower position. Do not install the top Mounting Bracket at this time.
2. Rest the Primary Collector against the Secondary Collector and space it about 1/4" to 1/2" apart.

TIP: The thickness of a 9/16" wrench is a good gap.

3. Insert one 3/8" Bolt into the Bolt Track of each Collector. Using the Aluminum Channel supplied (**Figure 11**), align the Bolts with the holes in the Channel. Place the Channel on the Bolts, center it between the two Collectors and apply Flat Washers and Nylon Lock Nuts to each. Tighten securely.

TIP: Insert one bolt in the Channel first, then align the second.

4. Repeat Step 3 on the opposite side of the Collector panels.
5. Remove the temporary spacers and install the top Mounting Brackets to the top of the Primary Collector, as outlined in the single Collector installation.

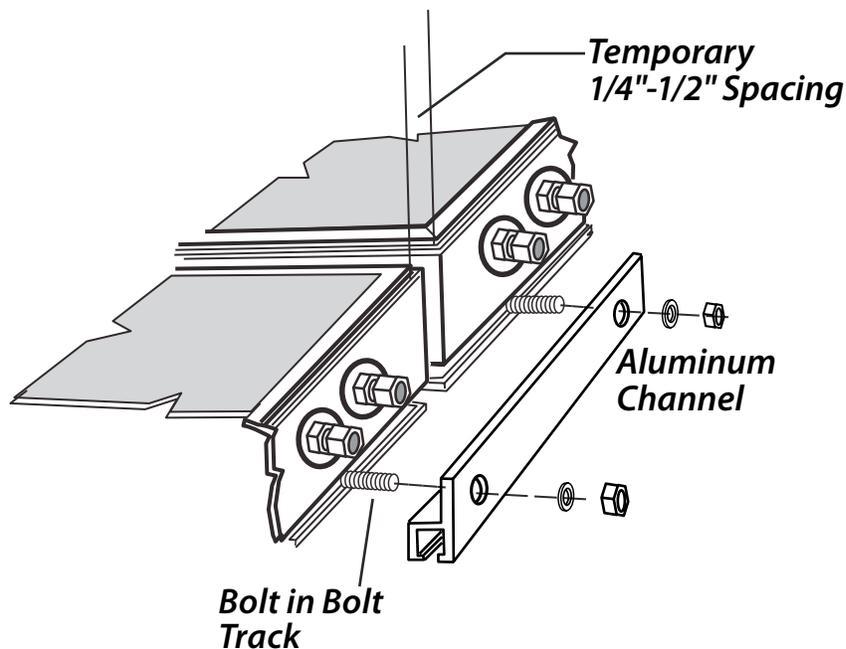


FIGURE 11

3E: Installing the Micro Tube Connection between Collectors



CAUTION

Over tightening the Micro-Tube connections can damage the Body Fitting on the Collector panels.

1. Remove the four (4) orange Caps from the Fittings on the Collectors.
2. Insert the two (2) insulated copper Micro-Tubes into the Solar Collector Ports.

TIP: Micro Tubing can be gently manipulated to align with Ports.

3. Turn the 3/8" Compression Nut on each Fitting Body until finger tight.
4. Using a 5/8" Wrench, tighten each Compression Nut one (1) full turn.

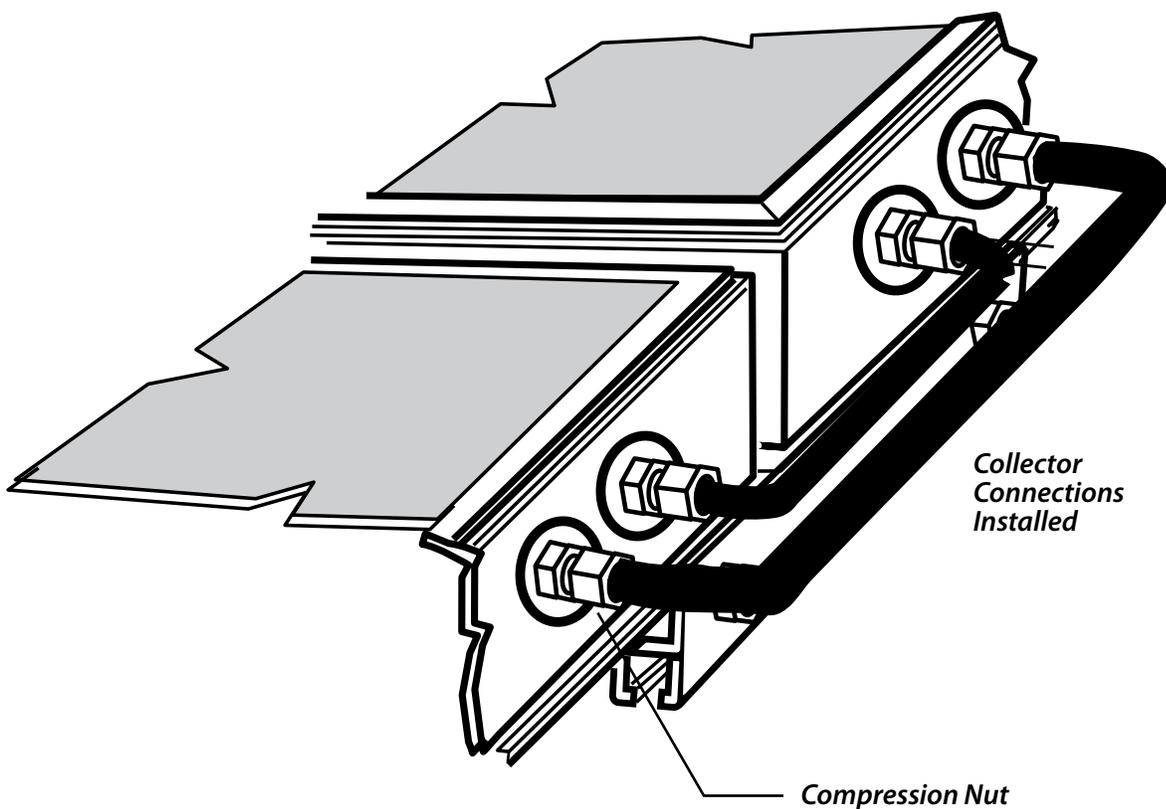
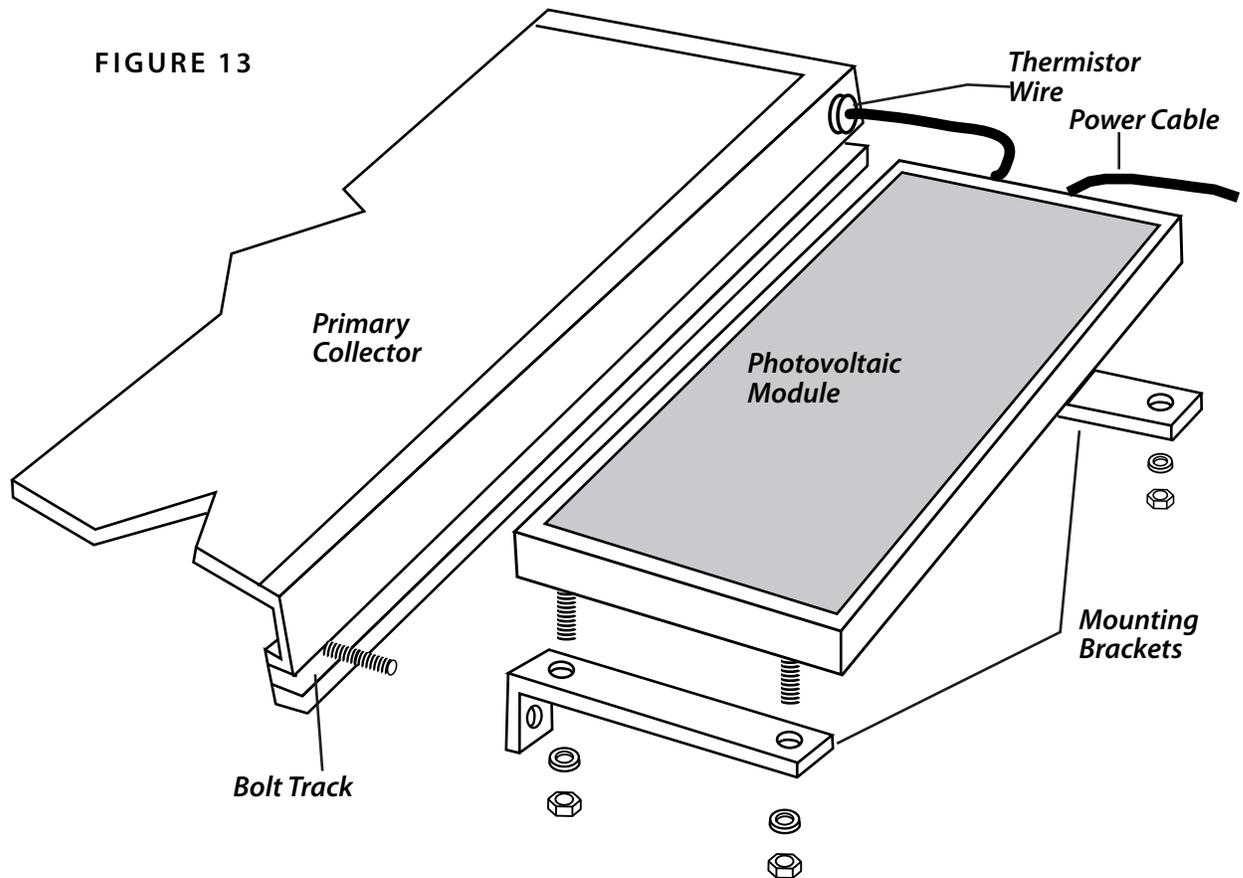


FIGURE 12

3F: Installing the Photovoltaic Module

The 20W Photovoltaic Module (**Figure 13**) is mounted to the Primary Collector and powers the SUNWARD Solar Pump. It is also fitted with a Thermistor wire that measures the temperature in the Primary Collector.

1. Attach the two Mounting Brackets to the bottom of the Photovoltaic Module using 5/16" Bolts, Flat Washers and Lock Nuts.
2. Insert two 3/8" Bolts into the side Bolt Track of the Primary Collector
3. Position the Photovoltaic Module as close to the top right hand corner of the Primary Solar Collector as possible, as shown in Figure 13.
4. Align the Bolts with the Mounting Bracket holes and place the Module on the Bolts.
5. Apply Brackets onto both Bolts with Flat Washers and Lock Nuts. Securely tighten the assembly.



3G: Connecting the Thermistor Wire and Power Cable

1. Insert the end of the Thermistor wire (**Figure 13**) into the Thermistor Port Terminal on the side of the Primary Collector, (the upper Collector if using two (2) Collectors). The wire should go in approximately 6-8".
2. Apply a liberal amount of silicon sealant provided on the Port terminal. Coil the excess Thermistor wire and secure it loosely with a Zip Tie to the Photovoltaic Module.

3H: Contractor Guidelines for Running the Micro-Tubing From the Collector(s) to the Heat Exchanger.

The SUNWARD Micro-Tubing will be used to connect the Solar Collectors to the Heat Exchanger. The Micro-Tubing is well insulated. However, any outside run should be through the Lineset Ducting provided (**Figure 14**) to protect it from the elements.

A separate Power Cable will be used to connect the Thermister and PV Module to the Heat Exchanger. The Power Cable should be run inside the Lineset Ducting as well.

1. Try to minimize the number of connections for the Micro-Tubing. Only use Compression Fittings of the type supplied for all Micro Tube connections, following the general procedures and precautions as outlined below.

CAUTION

Only use compression fittings supplied by SUNWARD. If you need more compression fittings, please call or go to our website.

CAUTION

Use a Pipe Cutter to cut the tubing. This will leave a clean, smooth edge. Hacksaw cuts will leave a rough, jagged finish that will cause leakage.

- Avoid distorting the tubing with pliers or gripping tools.
- Only install Compression Fittings on straight areas of tubing. Always allow at least 1-1/2" to 2" of straight tubing on either side of the fitting.
- Do not install Compression Fittings in areas of movement or vibration.

NOTE: Should minor leakage occur at a Fitting, a simple tightening of the Compression Nut will usually be sufficient to stop the leak.

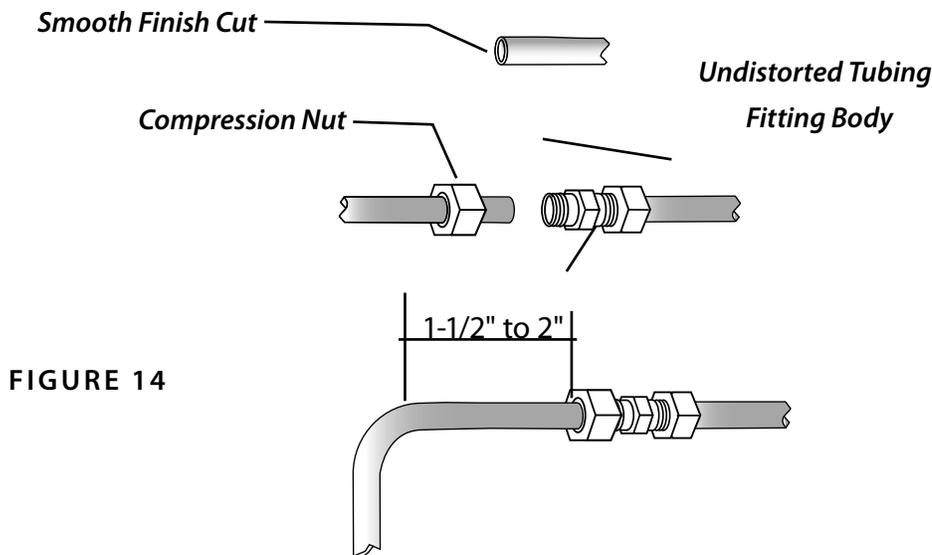


FIGURE 14

2. Unroll the Micro-Tubing and the Power Cable and run them to the Heat Exchanger in one of two (2) ways:
 - Penetrate the roof and run the Micro-Tubing down through an unused space or closet.
 - Penetrate the roof and run the Micro-Tubing through the attic and out the Gable End wall. Then run the Micro-Tubing down the outside of the wall and through the Sill plate.
3. Secure the Micro-Tubing and Power Cable approximately every 10 feet.

TIP: In many cases it may be easier to cut the Tubing, penetrate through a wall, and re-connect using Compression Fittings on the other side rather than uncoiling the whole Tube and passing it through the wall.

! CAUTION DO NOT kink the tubing.

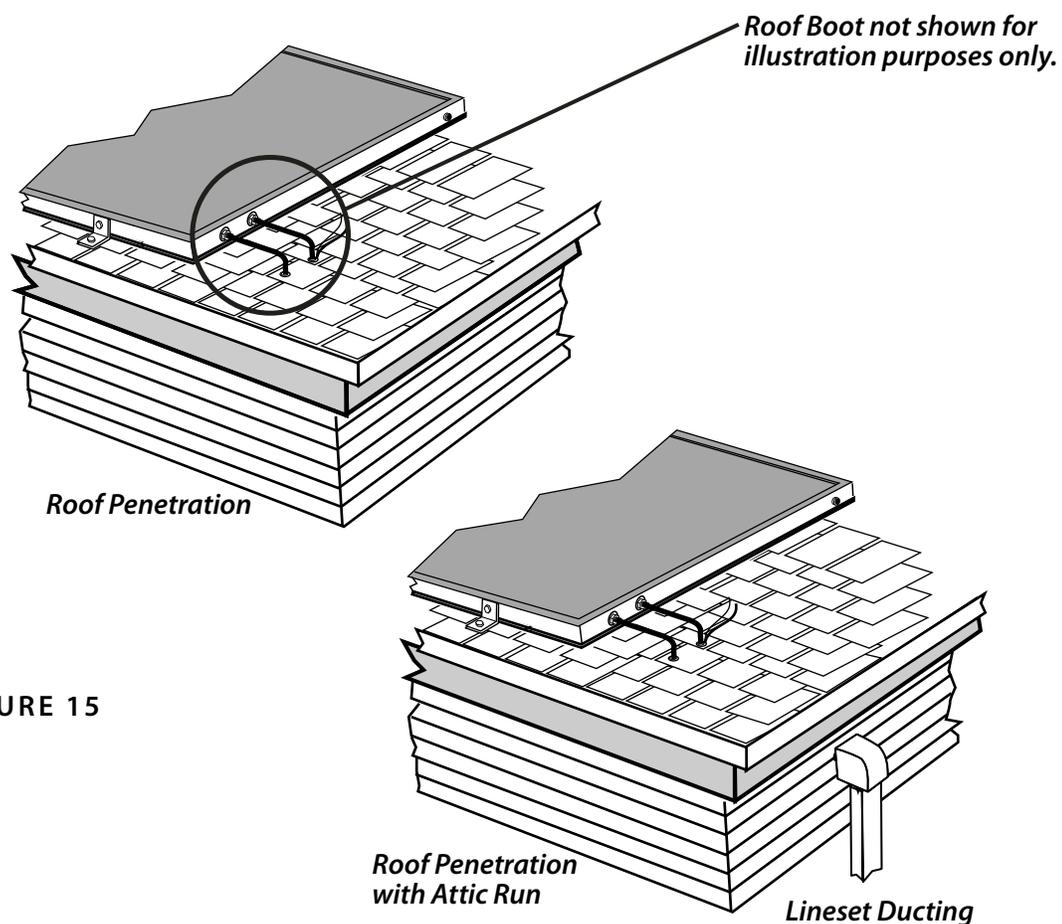
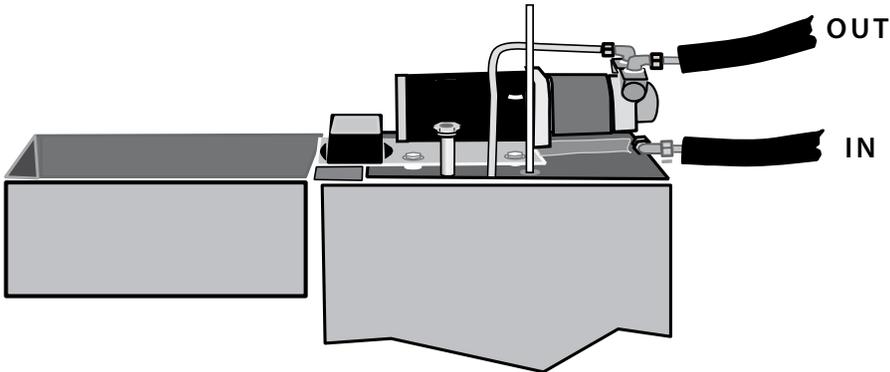


FIGURE 15

4

Follow the diagram below for proper flow direction.

- 1) With a 5/8" wrench, remove the plugs from both ports on the Heat Exchanger.
- 2) Install a provided compression nut on each port until finger tight.
- 3) Insert the 3/8 copper of the Micro-Tubing into a fitting on the Heat Exchanger until it bottoms out.
- 4) Using a 5/8" wrench, tighten the nut 3/4 turn. Do not over-tighten.
- 5) Repeat steps 3 and 4 for the opposing Micro-tube line.



NOTE: Be certain that the 3/8 copper has not been warped or burred before inserting it into a fitting. If warped or burred, re-cut the Tubing with a pipe cutter.