

6 Installing The Solar Collectors

6A: Types of Solar Collectors



WARNING

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

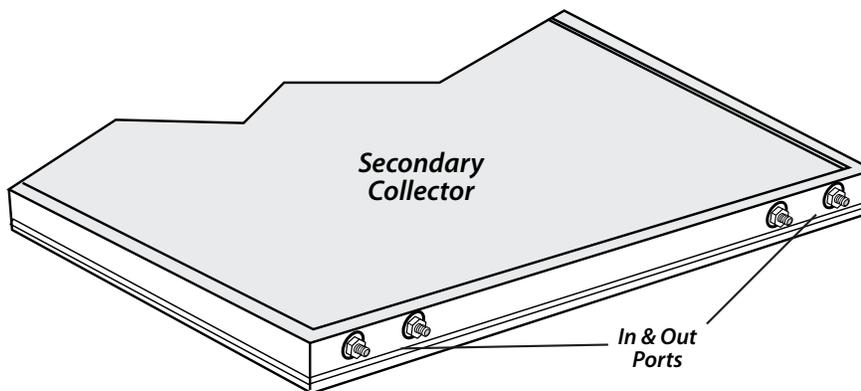
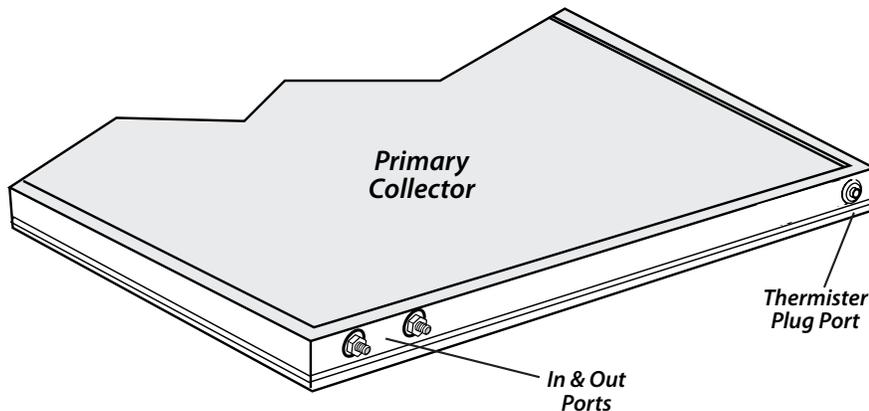


WARNING

Do not attempt to install the Collector Panels without another person as an assistant.

***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. A Secondary Collector will have two sets of IN and OUT Ports only.



6B: Mounting Two Collectors

1. Install the two lower (**Secondary**) Collector Mounting Brackets 1" above the bottom edge of the Roofing in the flat space between two ridges that is directly over a Rafter. The second Rafter from the end is preferred. If the Roofing alignment prevents this location, the end Rafter will also work.

NOTE: It is very important that the Brackets align with both the Strapping and the Rafter

2. Pre-drill two 1/4" holes through the Roof Panels, Roof Strapping and into the center of the Rafter.
3. Fill the drilled mounting holes in the rafters with the sealant (*provided in the Accessory Box*). Apply sealant to the base of the Brackets and secure the two (2) Lower Brackets using the supplied 3/8" Lag Bolts. Seal the perimeter of each Mounting Bracket Base with the sealant.
4. With the help of others, orient the Secondary Collector with the In/Out Ports facing East and position it on the Brackets. Center the Collector on the Brackets.
5. Slide two 3/8" hex bolts into the lower track and align with the lower Mounting Bracket slot. Secure and tighten the bolts with washers and lock nuts.

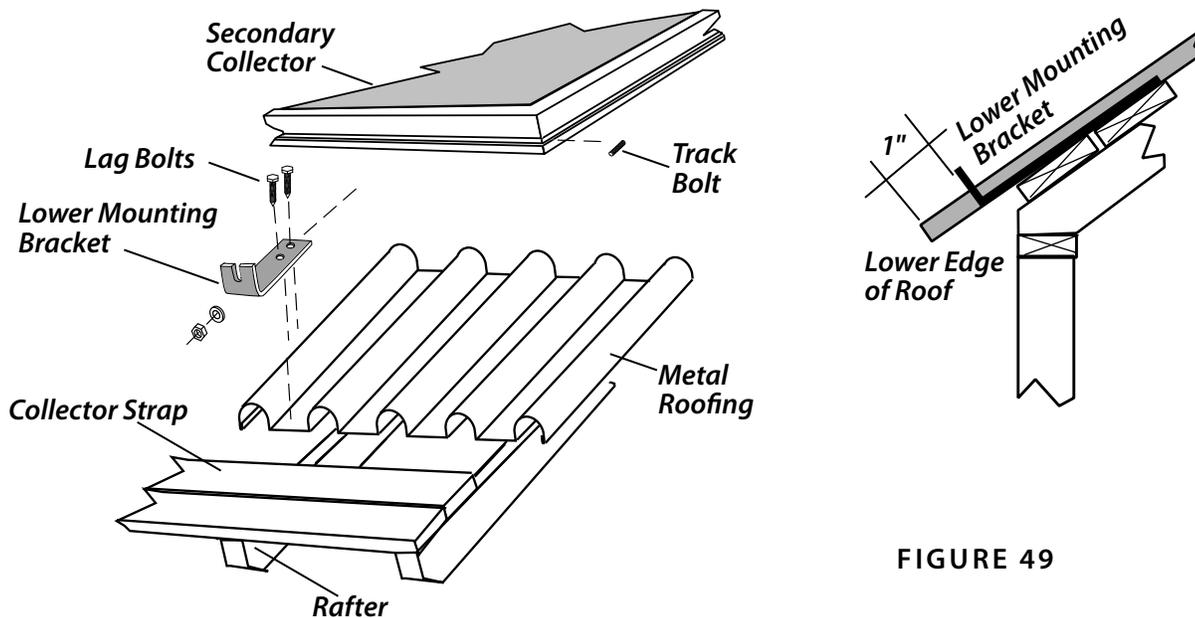


FIGURE 49

Two Collectors Contd'.

6. Insert two (2) 3/8" Bolts into the Bolt Track on the top of the Secondary Collector and install a Collector Gap Bracket to the mounted collector with the flange facing outward and located between the second and third Ridges from the outside of the Roof Panel as illustrated in Figure 50.

This Bracket will supply support for both Collectors. Apply Nuts and Washers and tighten. Repeat for the opposite side.

7. With the help of others, lay the Primary Collector above the Secondary Collector with the ports facing East. The bolts on the Collector Gap bracket will line up with the bolt track on the Primary Collector.

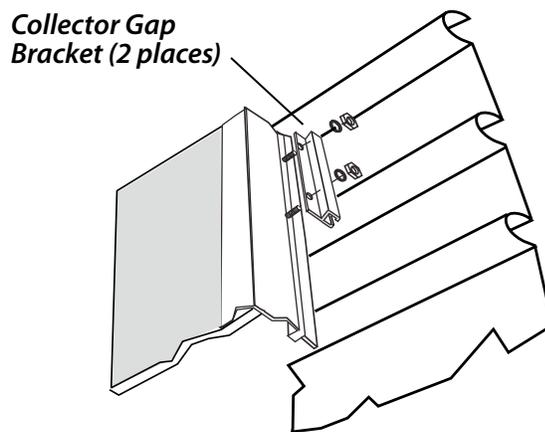


FIGURE 50

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8. Insert one 3/8" Bolt into the side Bolt Track of each Collector. Using the aluminum Angle Support supplied, align the Bolts with the holes in the Angle Support. Place the Support on the Bolts and center it between the two Collectors. Apply a Washer and Nut to each bolt. Tighten securely.

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

9. Repeat Step 8 on the opposite side of the Collector panels.

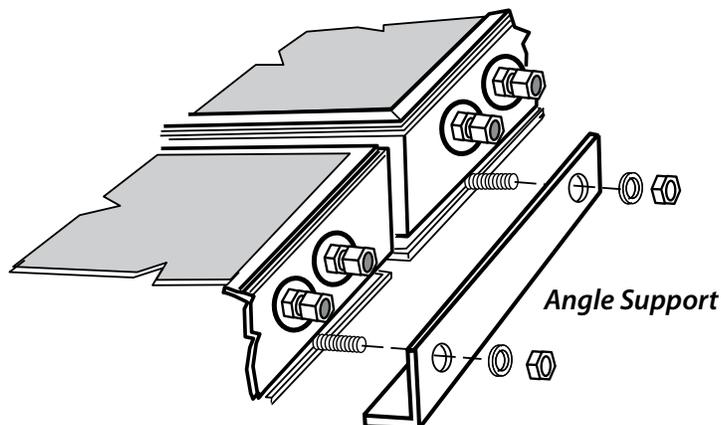


FIGURE 51

Two Collectors Continued

10. Slide two 3/8" Bolt heads into the Upper Bolt Track of the Primary Collector. Place the upper Mounting Brackets over the Bolts and slide the Brackets and Bolts into position over the selected rafters. These should be the same Rafters that the Lower Collector Brackets lined up with.
11. Drill through the mounting bracket holes into the Roof Panel, Strap and Rafter. Apply sealant as in Step 3.
12. Insert the Lag Bolts and tighten securely. Apply Washers and Nuts to the 3/8" Bolts. Tighten all securely.

6C: Installing the Ridge Cap

1. Referring to the instructions for the South Roof, Install the North Roof Section.
2. Install one section of the Ridge Cap. The Ridge Cap should cover the Upper Mounting Brackets.

NOTE: The amount of overhang beyond the frame on each end of the Ridge Cap is an aesthetic preference.

TIP: Use a tape measure to insure the Ridge Cap is straight, as shown in Figure 52.

3. Screw through the Ridge Cap and into the Ridge and upper Strapping. Align and apply the second fastener through the next Ridge.
4. Apply the second Ridge Cap and position it for the desired overhang. The second piece will overlap the first. Screw through the overlapping Ridge Caps into the Ridge and Upper Strapping. Fasten through the Ridge Caps at the remaining Ridge locations.

TIP: Screwing through the overlapped Ridge Caps may require pre-drilling or tapping,

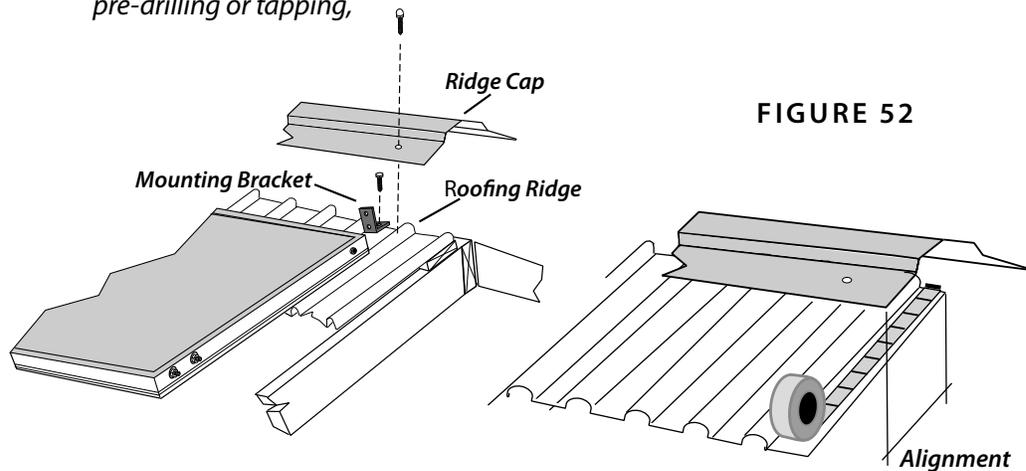


FIGURE 52

6D: Installing the Photovoltaic Module

The 20W Photovoltaic Module (**Figure 53**) is mounted to the Primary Collector and powers the SUNWARD Solar Pump.

1. Attach the two Mounting Brackets to the bottom of the Photovoltaic Module using and 5/16" Bolts, Washer and Lock Nuts.
2. Insert two 3/8" Bolts into the Collector bolt track.
3. Position the Photovoltaic Module as close to the top right hand corner of the Primary Solar Collector as possible as shown in Figure 53.
4. Align the Bolts with the Mounting Bracket holes and place the Module on the Bolts.
5. Apply a Lock Washer and Nut to both Bolts and securely tighten .
6. Connect the PV Cable to the Power Cable connector at the end of the Burial Kit.

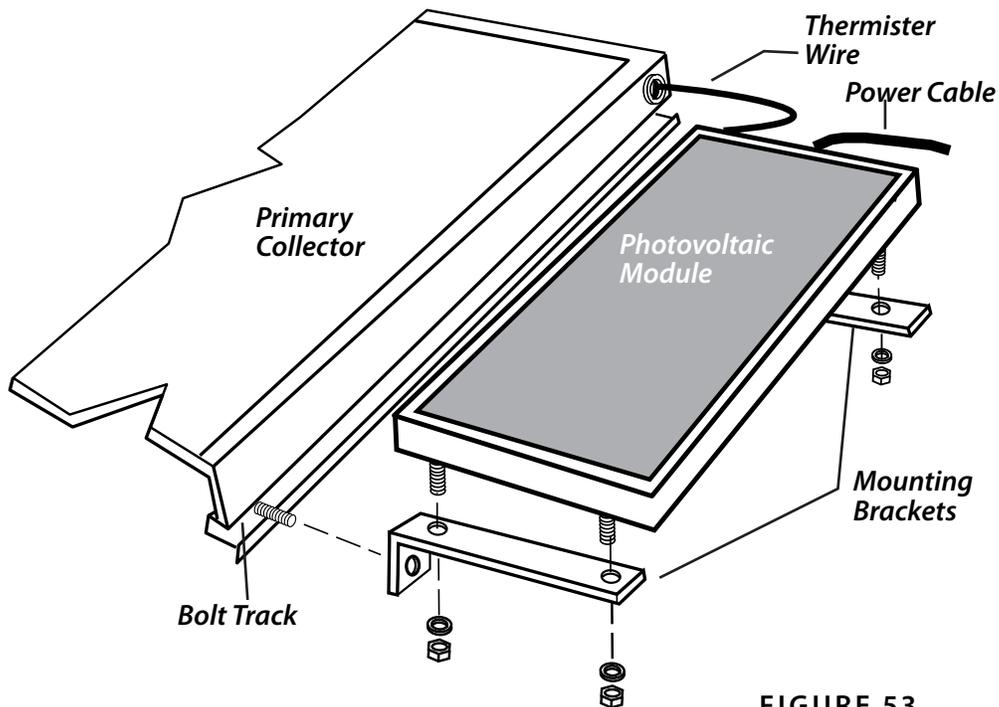


FIGURE 53

6E: Connecting the Thermistor Wire and Power Cable

1. Insert the end of the Thermistor wire into the 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 at the Photovoltaic Module.
3. Connect the Thermistor wire to the Power Cable connector at the end of the Burial Kit.

6F: 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.

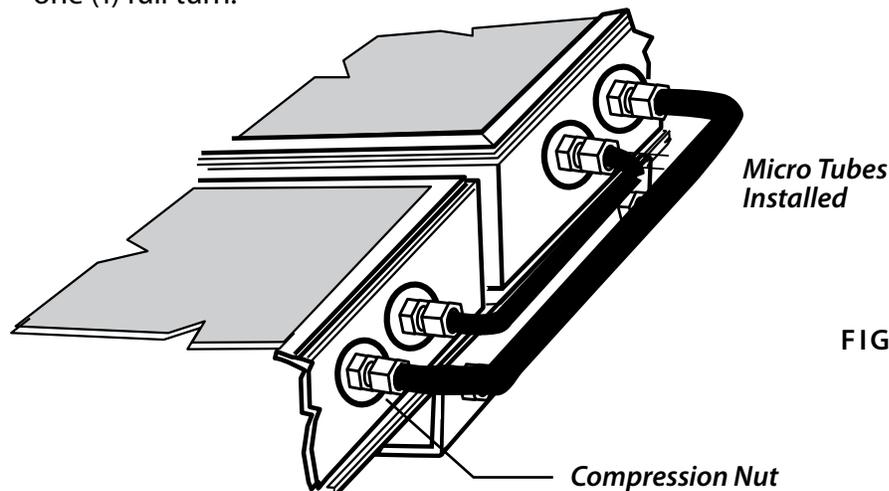


FIGURE 54

6G: Mounting a Single Collector

This section is for those installing a single collector on the Timber Frame. For 2 Collector installation, please refer to section 5B.

1. Install the two lower Mounting Brackets in the flat space between two Ridges directly over the Collector Strap and a Rafter. The second Rafter from the end is preferred. If the Roofing alignment prevents this location, the end Rafter will also work.

NOTE: It is very important that the Brackets align with both the Strapping and the Rafter

2. Pre-drill two 1/4" holes through the Roof Panels, Collector Strap and into the center of the Rafter.
3. Fill the drilled mounting holes in the rafters with the sealant (*provided in the Accessory Box*). Apply sealant to the base of the Brackets and secure the two (2) Lower Brackets using the supplied 3/8" Lag Bolts. Seal the perimeter of each Mounting Bracket Base with the sealant.

TIP: Measure the distance from the bottom edge of the Roofing to the lower Mounting Bracket. Repeat this dimension for the second Bracket to insure alignment.

4. With the help of others, orient the Collector with the In/Out Ports facing East and position it on the Brackets. Center the Collector on the Brackets.
5. Slide two (2) 3/8" hex bolts into the lower track and align them with the Lower Mounting Bracket slot. Secure and tighten the bolts with washers and Lock Nuts.

6G: Single Collector contd.

6. Slide the 3/8" Bolt heads into the Upper Bolt Track. Place the upper Mounting Brackets over the Bolts and slide the Brackets and Bolts into position over the selected rafters. Drill through the Mounting Bracket holes into the rafters. Apply sealant as in Step 3.
7. Insert the Lag Bolts and tighten securely. Apply Lock Washers and Nuts to the 3/8" Bolts. Tighten all securely.
8. Referring to the instructions for the two Collectors, install the Photovoltaic Module at this time.

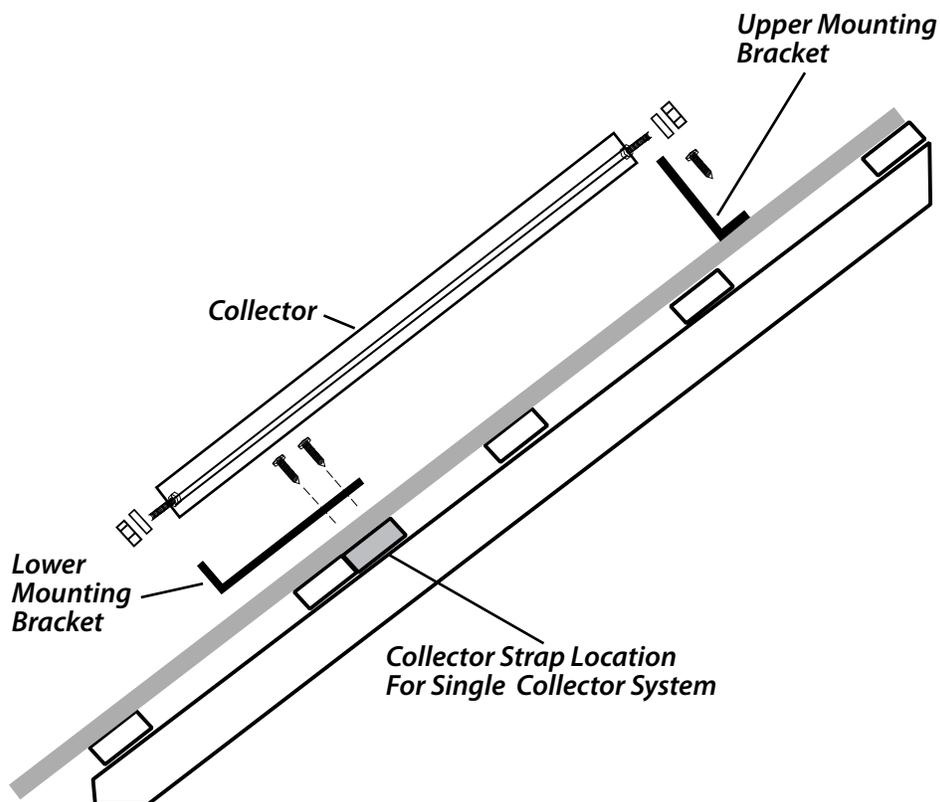


FIGURE 54

6H Running the Micro-Tubing & Cable

The SUNWARD Micro-Tubing will be used to connect the Solar Collectors to the Heat Exchanger. The Micro-Tubing is well insulated and housed in a 3 inch flexible conduit ready for direct burial.

Bundled with the Micro-Tubing in the Flexible Conduit is the Cable from the Photovoltaic Module and the Thermistor for connection to the Solar Pump.

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 Use a Pipe Cutter to cut the tubing. This will leave 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 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. Use two wrenches to tighten the Compression Fitting.

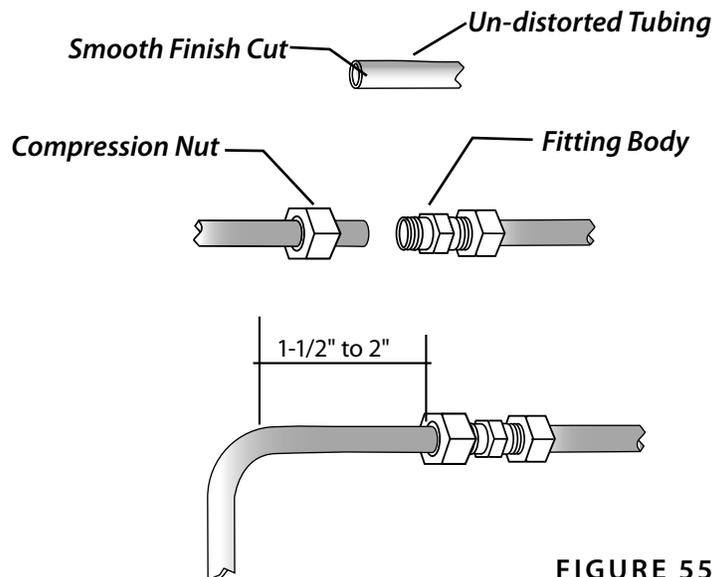


FIGURE 55

2. It is recommended that the Burial Kit tubing come out of the ground underneath the frame where it will be protected from damage.

Using a Tube Bender to avoid kinking, bend the tubing so that it exits the Frame and connects to the Collectors.

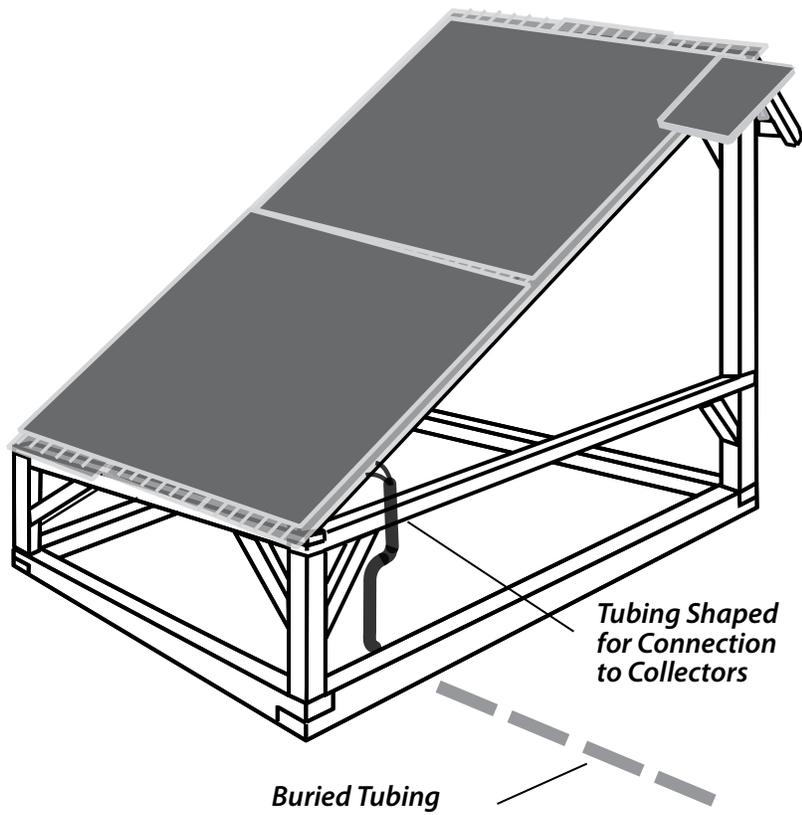


FIGURE 56

6 I: Burying the Micro Tubing

⚠ DANGER *Notify "Dig Safe" before digging. All utilities should be located and identified prior to any trench making activity. Failure to do so can result in serious injuries.*

⚠ CAUTION *Trenches must be a minimum of 18 inches deep in areas of traffic. All other areas require a minimum of 8 inches in depth.*

1. The South East corner of your Site location should be no further than 95 feet from the house for the 100 foot Burial Kit or 45 feet for the 50 foot Burial Kit as indicated in your Site Analysis.
2. Locate and mark the penetration point on your house.

TIP: Spray paint or mark with flags, as straight a line as possible from the ground mount location to the house penetration location.

3. With the coiled Power Cable towards the house, roll out the Burial Kit next to the markings to insure that you have sufficient Tubing to accomplish the run.
4. Dig a trench of proper depth from the house to the site. The trench should terminate as close as possible from the South East corner location to the the house penetration location to insure a clean entry.

TIP: If you encounter a large, unforeseen rock or boulder, re-route the trench around it.

⚠ CAUTION *Remove all rocks and sharp objects from the trench before installing the Burial Kit.*

6l: Burying continued

5. Lay the Bundle in the trench.
6. Measure and cut off the excess Burial Kit at both ends. The Conduit can terminate 2 inches above the ground level.

NOTE: Be certain not to cut the Power cable when cutting and removing the excess Burial Kit.

TIP: Use a Utility Knife with the blade setting at the shortest length to cut the Conduit.

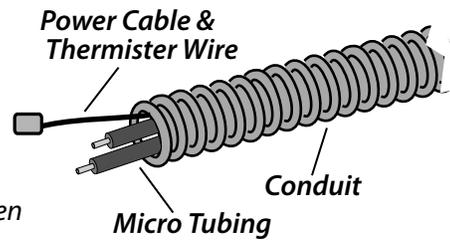


FIGURE 57

7. Bury the bundle making certain there are no sharp objects or large rocks resting against the Conduit. Holes in the Conduit will reduce the efficiency of the system.
8. Install a 3"x2" Coupler on both ends of the Conduit.

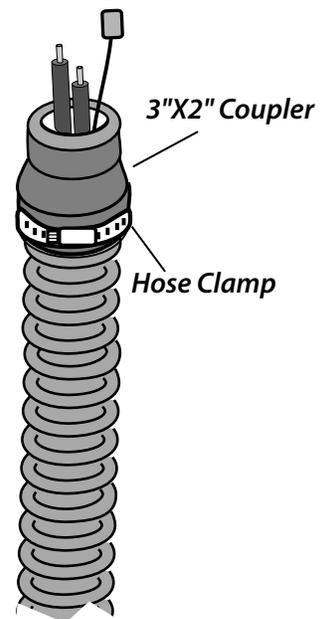
TIP: Stretch the wide end of the Coupler for an easier fit on the Conduit.

9. Tighten the Hose Clamp on the Coupler to make a water-tight seal.

NOTE: Do not over tighten the Clamp. This can distort the Conduit and cause water leakage.

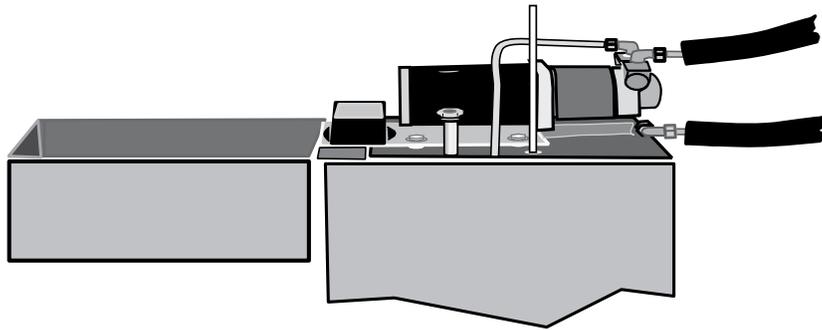
10. To keep debris and water from entering the Conduit, cover the end with a plastic bag until ready to make the Micro Tube connections.
11. You may now begin to assemble the Timber Frame.

FIGURE 58



6J: Connecting the Micro-Tube Lines to the Heat Exchanger

- 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.

FIGURE 59